THOMAS A. FENNIMAN
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RESTORATION, MODIFICATIONS & SITE IMPROVEMENTS

Located At

THE RENWICK LIGHTHOUSE

Lighthouse Park
Roosevelt Island, NY 10044

April 2020

Prepared For:
The Roosevelt Island Operating Corporation
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Roosevelt Island, NY 10044

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Lighthouse – circa 1890

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END OF SECTION 00 01 10

SECTION 00 01 15 – LIST OF DRAWING SHEETS

PART 1 - GENERAL

1.1 CONTRACT DOCUMENTS - GRAPHIC

A. List of graphic documents bound separately from this Project Manual that form part of the Contract Documents:

1. T-100.00: Cover Sheet
2. G-001.00: FIRM Map Effective 2007.
3. G-002.00: FIRM Map Effective 2013.
4. A-001.00: Plans as Existing.
5. A-002.00: Plans as Proposed.
6. A-100.00: Sitework Plan
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18. E-101.00 Lighting Schedules & Diagrams
19. E-102.00: Electrical Notes

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00 01 15

SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.1 BID INSTRUCTIONS

A. The Roosevelt Island Operating Corporation is seeking proposals for the proposed Work located at the Roosevelt Island Lighthouse as indicated in the enclosed documents.

1.2 BID DOCUMENTS

A. Project Drawings

B. Project Manual

C. Bid Form

D. Asbestos Report

1.3 SITE INSPECTION

A. Pre-bid walkthrough on _____.

1.4 QUESTIONS

A. Address questions to the Architect no later than _____, responses will be issued to all bidders.

1.5 BID SUBMISSION

A. Please submit **SEALED** completed bid forms no later than **12:00 pm** on _____ to the attention of:
_____

END OF SECTION 00 21 13

SECTION 00 31 26 – EXISTING ASBESTOS INFORMATION

PART 1 - GENERAL

1.1 ASBESTOS SURVEY REPORT

A. Samples listed in the report were collected at the Site by _____ and tested for Asbestos Containing Materials (ACM) by an independent New York State accredited laboratory, _____ on behalf of **The Roosevelt Island Operating Corp..** compiled the report. The report is intended for design & estimate purposes only, and is included to provide bidders with the same information available to the Owner. See the report overleaf for type, condition, location & approximate quantity of ACM.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00 31 26

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SECTION 00 41 00 - BID FORM

PROJECT NAME: Restoration, Modifications & Site Improvements of The Renwick Lighthouse located at LIGHTHOUSE PARK, Roosevelt Island, NY 10044

NAME OF BIDDER: _____

ADDRESS: _____

_____

TELEPHONE: _____

BASE BID: The undersigned having inspected the construction site and familiarized themselves with all conditions likely to be encountered affecting the cost and schedule of the work, and having examined all of the contract documents, hereby proposes to furnish all labor, materials, tools, equipment and services required to perform all the work in strict accordance with the contract documents for the base bid sum of:

_____

DOLLARS

BREAKDOWN OF BASE BID SUM:

GENERAL CONDITIONS

GC-1	Protection -	$ .....
GC-2	Scaffolding & Access -	$ .....
GC-3	Temp. facilities, incl. shanties, restrooms -	$ .....
	[NB: list temporary facilities to be provided under Clarification / Comments on last page/]	

WORK AREA A: TOWER, EXTERIOR

A-1	Stone masonry restoration - *[NB: include crack, dutchman repairs, patching w/ restoration mortar & repointing.]*	$ …….

WORK AREA B: TOWER, INTERIOR

B-1:	(N) Brick masonry repointing 100% - *[NB: include removal of existing cementitious layer at stairwell interior.]*	$ …….
B-2:	Removal of (e) wood stair & install (n) galvanized metal spiral stair -	$ …….
B-3:	(N) Reinforced concrete pad & landing at Ground Floor -	$ …….

WORK AREA C: LANTERN HOUSE

C-1:	Remove (e) concrete deck & (e) cast iron lantern -	$ .....
C-2:	Fabricate & install (N) blackened stainless steel observation deck, supports & railing - *[NB: include reinforced concrete ring beam.]*	$ .....
C-3:	Fabricate & install (N) painted steel Lantern structural framing -	$ .....
C-4:	Fabricate & install new glass lantern & door -	$ .....

WORK AREA D: FENESTRATION

D-1:	Window restoration, x 2 locations -	$ .....
D-2:	Metal Door modifications & restoration -	$ .....

WORK AREA E: SITE WORK

E-1a:	Remove & reset (e) flagstones in radial pattern -	$ .....
E-1b:	(N) Flagstones & curbing to match existing -	$ .....
E-2:	Remove & reset (e) perimeter curbing stones -	$ .....
E-3	Remove and reinstall (e) NRHP sign & plaque -	$ .....

WORK AREA F: LIGHTING

F-1:	Exterior recessed/Inground -	$ .....
F-2:	Exterior surface mounted fixtures at observation deck -	$ .....
F-3:	Interior surface mounted fixtures -	$ .....

WORK AREA G: LIGHTNING PROTECTION

G-1:	Installation of new grounded lightning protection system -	$ .....

ALLOWANCES:

Work specified as part of base project additional to that indicated on project drawings to be performed by the Contractor at the direction of and in locations determined by the Architect:

100 SF	Stone masonry repointing - *[assume **min. 10 linear foot** area in disparate locations]*	$ .....
10 SF	Brick masonry reconstruction - *[assume **min. 2 square foot** area in disparate locations]*	$ .....
10 Loc.	Stone patching (shallow ≤ 1") -	$ .....
10 Loc.	Stone patching (deep >1"≤ 2") -	$ .....
SUB-TOTAL	**ALLOWANCES -**	**$** _____

TOTAL BASE PROJECT - *The construction of the work shown in the Bid Documents with all labor, material, equipment, services and related items incidental to and necessary for satisfactory completion, including overhead and profit, for the lump sum of:* **$** _____

ALTERNATES:

The construction and completion of all labor, materials, equipment, services and related items incidental and necessary to complete satisfactorily the alternate work shown on the drawings, specifications and described below:

Add/Alt#1	Incorporate (n) photovoltaic array within structural glass panels by Onyx Solar - *[NB: coordinate fabrication & installation w/ Area C-4 New Lantern.*	$ ……
Add/Alt#2	Remove & reinstall (e) stone bollards on axis w/ entryway -	$ ……
Add/Alt#3	Remove **caulking** at door/window openings & lantern as ACM -	$ ……
Add/Alt#4	Provide & Install new laminated sign -	$ ……
Add/Alt#5	New carved entablature above lighthouse entrance -	$ ……
Add/Alt#6	Install new Lumendome Large LED fixture by Lumenpulse at existing stanchion at Lantern -	$ ……
Add/Alt#7	Fabricate & install (N) blackened stainless steel Lantern structural framing.	$ ……

UNIT PRICE:
(including overhead & profit)

1A.	Brick masonry reconstruction - *[assume min. 1 square foot area in disparate locations]*	$ _____ /SF
1B.	Brick masonry repointing - *[assume 1 brick masonry unit in disparate locations]*	$_____ /SF
1C.	Stone masonry replacement - /Unit	$_____
1D.	Brick masonry spall repair -	$_____ /SF
1E	Brick masonry crack repair -	$_____ /LF
2.	Door/Window perimeter sealant replacement - *[between opening & frame]*	$_____ /LF
3A.	Stone patching (shallow) -	$ _____/Loc
3B.	Stone patching (deep) -	$_____/Loc
3C.	Ashlar partial stone replacement [dutchman] - *[rock-faced, random course, ashlar; assume **6" x 6" x 4"** dimension p/loc.]*	$_____/Unit
3D.	Carved perimeter curb partial stone replacement [dutchman] - *[color, finish & texture to match existing; assume **8" x 8" x 4"** dimension p/loc.]*	$_____/Unit

HOURLY RATES:
(including overhead & profit)

Foreman -	$_____ /Hour
Mason -	$_____ /Hour
Laborer -	$_____ /Hour
Welder -	$_____ /Hour
Electrician -	$_____ /Hour

SCHEDULE:

The undersigned agrees to substantially complete the work within the following period of time:

Mobilization: _____ Wks

Work on-site: _____ Wks

TOTAL: _____ Wks

List additional periods of time to be added to Schedule for Alternate Scope only where applicable:

Add/Alt #1: _____ Wks

Add/Alt #2: _____ Wks

Add/Alt #3: _____ Wks

Add/Alt #4: _____ Wks

Add/Alt #5: _____ Wks

Add/Alt #6: _____ Wks

Add/Alt #7: _____ Wks

QUALIFICATIONS:

(list where applicable, attaching additional sheets where necessary)

LIST OF SUB-CONTRACTORS:

(list where applicable, attaching additional sheets where necessary)

WORK SEQUENCE:

Bidders shall submit both a written & a diagrammatic description of the proposed work sequence, indicating construction activities incl, but not limited to, locations of sidewalk protection, scaffolding & phasing of work; see Division 00 Section "Summary', §1.3 Work Sequence.

SIGNED:

We certify that we are familiar with the contents of the Contract Documents for this project and that we have examined the site and accept the conditions under which the work will be done.

_____

(signature) *(date)*

_____

(printed name) *(title)*

CLARIFICATIONS/COMMENTS:

(list where applicable, attaching additional sheets where necessary)

END OF SECTION 00 41 00

***

SECTION 00 72 00 – GENERAL CONDITIONS

PART 1 - GENERAL

1.1 REQUIREMENTS AND REGULATIONS

A. Contract Documents:

1. The CONTRACTOR shall inspect the Building and surroundings to acquaint themselves with all conditions and to verify all field conditions affecting his work. Any discrepancies between the contract documents and the actual conditions as noted by the CONTRACTOR shall be immediately brought to the attention of the ARCHITECT.
2. The CONTRACTOR shall verify figures and dimensions shown on drawings before executing work and will be held responsible for errors resulting from his failure to exercise said precaution. Consult ARCHITECT for all necessary dimensions not given.

B. Permits: The CONTRACTOR shall obtain and pay for all permits, licenses and approvals as required by all codes, ordinances and authorities having jurisdiction over work involved in completing the project based upon plans that may be filed with the Building Department. The CONTRACTOR shall comply with and give notices required by agencies having jurisdiction over the work. The CONTRACTOR shall promptly notify the ARCHITECT in writing of any known inconsistencies in the Contract Documents with such governmental laws, rules and regulations. Note: Building Department Expediting shall be by others.

C. Insurance: Before commencing any work under this contract, the CONTRACTOR shall have in its possession the necessary and required insurance policies as follows:

_____INSERT INSURANCE REQUIREMENTS_____

D. Means and Methods:

1. The ARCHITECT is not responsible, in any way, for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work, nor for the failure of any contractor or sub-contractor to carry out the work in accordance with the construction documents.
2. The ARCHITECT is not responsible for acts or omissions of contractors or sub-contractors, their agents and employees, employees of the Owner or any other persons performing work on the Project.

E. Guarantee:

1. All equipment, material and workmanship shall be guaranteed to be watertight and to be free from defects and the CONTRACTOR shall promptly correct any required replacement, the OWNER may have the required work done by others and recover from the CONTRACTOR the cost of making the same and damage, if any, resulting there from.
2. **The period of guarantee for all work other than roofing shall be FIVE (5) years, from the date of acceptance of the work by the OWNER.** The subject

date of acceptance shall be that on which final approval by the OWNERS REPRESENTATRIVE is given on the CONTRACTOR'S final invoice or the date on which the CONTRACTOR'S retainer is released, whichever is later.

3. **The period of guarantee for roofing shall be <u>as stated within the specification section</u>, from the date of acceptance of the work by the OWNER.** The subject date of acceptance shall be that on which final approval by the OWNERS REPRESENTATIVE is given on the CONTRACTOR'S final invoice or the date on which the CONTRACTOR'S retainer is released, whichever is later.

F. Safety:

1. The CONTRACTOR agrees to comply with all terms and provisions of the Williams-Steigler Occupational Safety and Health Act of 1970, and the standards promulgated by the secretary of Labor there under. The CONTRACTOR shall indemnify the OWNER and the ARCHITECT as against any penalty, charge, cost or damage including legal fees incurred by the OWNER by reason of the CONTRACTOR'S failure to comply with any and all applicable safety and health standards issued by any public authority have jurisdiction for the safety of persons or property, or for failure to comply with any of the safety precautions and programs provided in this article.

G. Payments: Partial payments will be made as the work progresses, for labor and materials installed. The requests for partial payments shall be submitted on a monthly basis.

H. Retainage:

1. In making partial payments, there shall be retained ten percent (10%) of the estimated amount until the final completion and acceptance of all work covered by the contract.
2. Ten percent (10%) shall be retained until thirty (30) days after the entire work covered by the contract has been fully completed, and the CONTRACTOR has paid all claims for labor and material furnished on said work evidenced by submissions of releases of liens from all suppliers and subcontractors and has obtained the certification of the OWNERS REPRESENTATIVE with respect to final completion.

I. Change Orders: All changes shall be approved in writing by the OWNER and OWNERS REPRESNTATIVE. No changes shall be made without the OWNER'S and the OWNER'S REPRESNTATIVES signatures.

J. Debris Removal:

1. During the course of work, the CONTRACTOR shall remove all waste material and debris from the work area on a daily basis during working hours. On-site storage of debris shall be only as allowed by the OWNER. All debris shall be disposed of promptly in a manner consistent with all local codes and ordinances.
2. Note: All debris shall be collected and emptied by mini containers stored in the rear yard on a daily basis.
3. The area affected by the actual construction work shall be left broom clean at the end of the job. Any areas outside of the actual construction area that are utilized or damaged by the construction shall be returned to their original condition at the end of the job. These areas include but are not limited to stairways, yards, roof areas, storerooms, etc.

K. Protection:

1. The premises are at no time to be left unsecured against intruders when workmen are not on job. Take maximum care to protect premises and OWNERS' possessions against damage by weather.
2. All areas, parts and surfaces of the building interior, exterior, and surrounding landscaping shall be protected from damage. The CONTRACTOR is responsible for any building or landscape damage incurred during the course of the work.
3. Note: Interior floor protection, where required, shall be Masonite.
4. Existing and newly installed finished surfaces shall be protected by suitably approved means, leave clean and free from marring and damage at time of final acceptance.

L. Fire Protection:

1. Operations such as welding, soldering, and other operations requiring flame shall be conducted in a fireside manner. Welding permits must be obtained and displayed as required by the pertinent agencies.
2. An appropriate type fire extinguisher shall be on hand at the site at all times. A fire watch shall be provided and held for at least one (1) hour following welding or torch cutting operations to detect possible smoldering fires.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00 72 00

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Work sequence.
3. Use of supported pipe scaffolds.
4. Use of premises.
5. Owner's occupancy requirements.
6. Specification formats and conventions.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Restoration, Modifications & Site Improvements.

1. Project Location: The Renwick Lighthouse
Roosevelt Island, New York, NY.

B. Owner: The Roosevelt Island Operating Corp. (RIOC).
Attn. Shelton Haynes COO

1. Owner's Representatives: The LiRo Group
680 Main Street
Roosevelt Island, NY 10044
Attn: Trevor Engblom, Project Manager
Emma Kravitz, Project Engineer

C. Architect: Thomas A. Fenniman, Architect.
One Union Square West, #501
New York, NY 10003
Attn. Samuel Harris, Project Architect

D. The Work consists of the following:

1. The Restoration of the Historic Lighthouse Tower including the following work areas:
   a. Stucco removal and Brick Restoration.
   b. Stone Restoration.
   c. Window Restoration.
   d. Door Restoration.

2. The Modifications of the Lighthouse Lantern and Observation Deck including the following work areas:

a. Removal of deteriorated concrete deck.

b. Installation of a new concrete ring beam and fluid applied waterproofing.

c. Installation of new stainless steel observation deck and railing.

d. The installation of a new glass and structural steel lantern in historic configuration.

e. The removal of wood stair and the installation of a new metal spiral stair.

f. New electrical and accent lighting.

3. Site Improvements at the Lighthouse including the following work areas:

a. The resetting and installation of new stone pavers and curb stones.

b. The installation of a new concrete grade beam at curb.

c. The installation of new recessed in ground lighting and controls.

E. Project will be constructed under a single prime contract.

1.3 WORK SEQUENCE

A. The Contractor shall submit for Owner's consideration both a written and a diagrammatic description of their proposed work sequence and schedule.

B. Before commencing Work, submit a schedule showing the sequence, commencement and completion dates for all phases of the Work.

1.4 CONTRACTORS USE OF PREMISES

A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.

B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Owner Occupancy: The building is currently off limits to the public and will remain so throughout the project.

C. Use of Existing Building: Maintain existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its contents during construction period.

D. Work hours shall be as established by the Owner through the Owners Representative.

E. Inform the Owners Representative of work area access requirements. The Owners Representative will coordinate and schedule the requirements with Facility staff to obtain and ensure timely availability of work areas.

F. Comply with the Building's Visitor Identification Policy.

G. The following items are not allowed on the Site or on the Buildings premises.

a. Firearms, ammunition, weapons, and dangerous instruments (other than tools required for the Work).
b. Alcoholic beverages and persons under the influence of same.
c. Illegal controlled substances and persons under the influence of same.
d. Smoking of any kind.

H. Be responsible and accountable for employees, suppliers, subcontractors and their employees, with regard to their use of the premises. Direct them to comply with the Building Regulations and with the security regulations.

I. Furnish Owner Representative with a telephone number or method to contact the supervisor for the Work in case of an emergency after work hours, including weekends and holidays.

J. Comply with applicable federal and State of New York Right-to-Know Law provisions and supply copies of the appropriate Material Safety Data Sheets (MSDS) to the Owner's Representative.

K. Direct employees to be watchful for people in or near the work area where safety hazards may be present.

L. Report fire and other emergency situations to the Owner Representative immediately.

1.5 SPECIAL INSPECTIONS

A. Special Inspections and tests are required by the Building Code of New York State. Inspections & Testing Services will be provided by the Owner unless otherwise noted.

B. Contractors are responsible for notifying the Owners Representative regarding individual inspections listed in the Construction Documents. Contractors shall cooperate with the inspectors and testing agencies and sufficient notice and lead time (minimum 48 hours) must be allowed for inspection and testing to be performed.

C. Where deficiencies are identified, the contractor must take corrective actions to comply with the contract documents or remedy the deficiencies in accordance with the General Conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contract Documents, including but not limited to, the Bid Form, Drawings and Individual Specification Sections apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents and the Bid Form by allowances. Allowances have been established in lieu of additional requirements and to defer selection of work to a later date when direction will be provided to the Contractor.

B. Types of allowances include the following:

1. Quantity of Work allowances.

C. Related Sections:

1. Section 007200 - General Conditions.
2. Section 012900 - Payment Procedures.
3. Section 013300 - Submittal Procedure.
4. Individual Specification Sections for items of Work covered by allowances.

1.3 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.4 COORDINATION

A. Coordinate allowance items with other portions of the Work.

B. The Contractor shall include the dollar value of each scheduled allowance number as a separate line item in the Schedule of Values.

C. The OWNER'S REPRESENTATIVE shall provide the Contractor with a Notice to Proceed prior to proceeding with the Work of an allowance.

1.5 PAYMENT

A. Refer to Section 012900 - Payment Procedures, for processing an Application for Payment.

1.6 LUMP-SUM AND QUANTITY OF WORK [UNIT-COST] ALLOWANCES

A. Allowance shall include cost to the Contractor of specific products and materials ordered by the Owner or selected by the Architect under allowance and shall include taxes, freight, and delivery to the Project site.

B. The Contractor's costs for receiving & handling at the Project site, labor, installation, overhead & profit, & similar costs related to products & materials ordered by the Owner selected by the Architect under allowance shall be included as part of the allowance.

1.7 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts and scope of Work, prepare a Change Order proposal based on the difference between amount installed and the allowance.

1. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
2. The Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
3. No change to the Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

3.1 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.2 SCHEDULE OF ALLOWANCES

A. See Bid Form - 00 41 00

END OF SECTION 012100

SECTION 01 22 00 – UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. As indicated on Bid Form Section 004100.

END OF SECTION 01 22 00

SECTION 01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.

2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. As identified on the Bid Form Section 004100.

END OF SECTION 01 23 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions" or other format.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: OWNER'S REPRESNTATIVE will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by OWNER'S REPRESNTATIVE are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 7 days after receipt of Proposal Request, submit a quotation estimating adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to OWNER'S REPRESNTATIVE.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.4 ALLOWANCES

A. See Division 00 Section “Bid Form” for definition and quantities.

1. Prepare explanation and documentation to substantiate claims against allowances.
2. Submit substantiation of claims against allowances to coincide with requisitions.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect or Contractor may issue a Change Order for signatures of Owner and Contractor on RIOC issued CHANGE ORDER FORM.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: The OWNER’S REPRESENTATIVE may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with the Bid Form.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets.
2. Submit the Schedule of Values to OWNER'S REPRESENTATIVE at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the Bid Form as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Work Area.

1. Submit draft of AIA Document G703 Continuation Sheets.
2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Bid Form. Provide line items for principal subcontract amounts, where appropriate.
3. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
4. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
5. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by OWNER'S REPRESENTATIVE and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. OWNER'S REPRESNTATIVE will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to OWNER'S REPRESNTATIVE by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. Schedule of Values.
2. Contractor's Construction Schedule (preliminary if not final).
3. Submittals Schedule (preliminary if not final).
4. List of Contractor's staff assignments.
5. List of subcontractors (to be submitted for approval prior to the execution of the construction agreement and to be attached to the agreement as an exhibit.)
6. Copies of building permits.

7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
8. Certificates of insurance and insurance policies. (To be submitted prior to the commencement of any work.)

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. Evidence that claims have been settled.
7. Manufacturers' warranties.
8. Governmental sign-offs and approvals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Field condition reports.

B. See Division 01 Section "Payment Procedures" for submitting the Schedule of Values.

C. See Division 01 Section "Photographic Documentation" for submitting construction photographs.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

1.3 SUBMITTALS

A. Submittals Schedule: Submit three copies of schedule to the OWNER'S REPRESNTATIVE within 15 days after the Construction Contract is executed. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Owner's Representative's final release or approval.

B. Contractor's Construction Schedule: Submit three copies of initial schedule, large enough to show entire schedule for entire construction period to the OWNER'S REPRESNTATIVE within 15 days after the Construction Contract is executed.

1. Submit an electronic copy of schedule in Microsoft Project or Primervera format, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date in the file name and subject line of email.

C. Field Condition Reports: Submit one copy at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of **more than 60 days**, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

a. Stone
b. Structural steel
c. Metal fabrications
d. Glass fabrications
e. Lighting

2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work Restrictions: Show the effect of the following items on the schedule:

a. Coordination with existing construction.
b. Limitations of continued occupancies.
c. Use of premises restrictions.
d. Provisions for future construction.
e. Seasonal variations.
f. Environmental control.

3. Work Stages: Indicate important stages of construction for each major portion of the Work.
4. Other Constraints: Site safety.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule **within 30 days** of date established for commencement of the Work. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.4 REPORTS

A. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for

interpretation AIA Document G716. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before kick-off meeting and at no less frequently than monthly intervals thereafter.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. See Division 01 Section "Closeout Procedures" for submitting warranties.

1.2 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.

1. Initial Review: Allow 15 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Re-submittal Review: Allow 15 calendar days for review of each re-submittal.

C. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 4 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name and address of Contractor.
e. Name and address of subcontractor.
f. Name and address of supplier.
g. Name of manufacturer.
h. Number and title of appropriate Specification Section.
i. Drawing number and detail references, as appropriate.
j. Location(s) where product is to be installed, as appropriate.
k. Other necessary identification.

D. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

E. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.

F. Re-submittals: Make re-submittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked “APPROVED” or “APPROVED AS NOTED”.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

H. Use for Construction: Use only final submittals with mark indicating “APPROVED” or “APPROVED AS NOTED” by Architect.

PART 2 - PRODUCTS

2.1 SUBMITTALS

A. General: Prepare and submit Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.

b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Manufacturer's catalog cuts.
e. Compliance with specified referenced standards.
f. Testing by recognized testing agency.

4. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Architect will return two copies. Retain one returned copy as a Project Record Document.

C. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

1. Architect will not review submittals that include MSDSs and will return them for re-submittal.

D. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Shopwork manufacturing instructions.
f. Templates and patterns.
g. Schedules.
h. Notation of coordination requirements.
i. Notation of dimensions established by field measurement.
j. Relationship to adjoining construction clearly indicated.
k. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
3. Number of Copies: Submit three copies of each Shop Drawing, unless otherwise noted. Architect will return two copies. Retain one returned copy as a Project Record Document.

E. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit two sets of Samples. Architect will retain one Sample set; remainder will be returned. Retain one returned Sample set as a Project Record Sample.

F. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.

G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Submit copy of subcontractor list to Owner and Architect.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. "APPROVED": Final unrestricted release; portion of work covered by submittal may proceed, provided that it complies with the requirements of the Contract Documents. Final acceptance will depend upon compliance.
2. "APPROVED AS NOTED": Final restricted release; portion of work covered by submittal may proceed, provided that it complies with notations and/or corrections on the submittal and the requirements of the Contract Documents. Final acceptance will depend upon compliance.
3. "REVISE & RESUBMIT": Returned for resubmittal; portion of work covered by the submittal may not proceed, including purchasing, fabrication, delivery or other activity. Revise or prepare new submittal in accordance with notations and/or corrections on the submittal and the requirements of the Contract Documents.
4. "REJECTED": Rejection; portion of work covered by the submittal may not proceed, including purchasing, fabrication, delivery or other activity. Prepare new submittal in accordance with the requirements of the Contract Documents.

C. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

D. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

SECTION 01 35 91 - HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes special procedures for historic treatment on Project including, but not limited to, the following:

1. Storage and protection of existing historic materials.
2. Temporary protection of historic materials during construction.
3. Protection during application of chemicals.
4. Historic treatment procedures.

1.2 DEFINITIONS

A. "Preservation": To apply measures necessary to sustain the existing form, integrity, and materials of a historic property. Work may include preliminary measures to protect and stabilize the property.

B. "Rehabilitation": To make possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

C. "Restoration": To accurately depict the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.

D. "Reconstruction": To reproduce in the exact form and detail a building, structure, or artifact as it appeared at a specific period in time.

E. "Stabilize": To apply measures designed to reestablish a weather-resistant enclosure and the structural reinforcement of an item or portion of the building while maintaining the essential form as it exists at present.

F. "Protect and Maintain": To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.

G. "Repair": To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.

H. "Replace": To duplicate and replace entire features with new material in kind. Replacement includes the following conditions:

1. Duplication: Includes replacing elements damaged beyond repair or missing. Original material is indicated as the pattern for creating new duplicated elements.
2. Replacement with New Materials: Includes replacement with new material when original material is not available as patterns for creating new duplicated elements.
3. Replacement with Substitute Materials: Includes replacement with compatible substitute materials. Substitute materials are not allowed, unless otherwise indicated.

I. "Remove": To detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

J. "Remove and Salvage": To detach items from existing construction and deliver them to Owner ready for reuse.

K. "Remove and Reinstall": To detach items from existing construction, repair and clean them for reuse, and reinstall them where indicated.

L. "Existing to Remain" or "Retain": Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled.

M. "Material in Kind": Material that matches existing materials, as much as possible, in species, cut, color, grain, and finish.

1.3 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Removed and Salvaged Historic Materials:

1. Clean salvaged historic items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to storage area designated by Owner.
5. Protect items from damage during transport and storage.
6. Do not dispose of items removed from existing construction without prior written consent of Owner.

B. Removed and Reinstalled Historic Materials:

1. Clean and repair historic items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by Architect, items may be removed to a suitable, protected storage location during historic treatment and cleaned and reinstalled in their original locations after historic treatment operations are complete.

D. Storage and Protection: When removed from their existing location, store historic materials within a weathertight enclosure where they are protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.

1. Identify removed items with an inconspicuous mark indicating their original location.

1.4 PROJECT-SITE CONDITIONS

A. Exterior Work:

1. Proceed with the work only when forecasted weather conditions are favorable.

a. Wet Weather: Do not attempt repairs during rainy or foggy weather. Do not apply primer, paint, putty, or epoxy when the relative humidity is above 80 percent. Do not remove exterior elements of structures when rain is forecast or in progress.
b. Do not perform exterior wet work when the air temperature is below 40 deg F.
c. Do not begin cleaning, patching, or repairing when there is any likelihood of frost or freezing.
d. Do not begin cleaning when either the air or the surface temperature is below 45 deg F unless approved means are provided for maintaining a 45 deg F temperature of the air and materials during, and for 48 hours subsequent to, cleaning.

2. Perform cleaning and rinsing of the exterior only during daylight hours.

B. Owner will occupy portions of building immediately adjacent to historic treatment area. Conduct historic treatment so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION, GENERAL

A. Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Temporary Protection of Historic Materials during Construction:

1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.
2. Attachments of temporary protection to existing construction shall be approved by Architect prior to installation.

D. Protect landscape work adjacent to or within work areas as follows:

1. Provide barriers to protect tree trunks.
2. Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than 8 hours at a time.
3. Set scaffolding and ladder legs away from plants.

E. Existing Drains: Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify Architect immediately of drains or systems that are stopped or blocked. Do not begin Work of this Section until the drains are in working order.

1. Provide a method to prevent solids including stone or mortar residue from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed under this Contract.
2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

B. Cover adjacent surfaces with materials that are proven to resist chemical cleaners selected for Project unless chemicals being used will not damage adjacent surfaces. Use covering materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.

C. Do not clean surfaces during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

D. Neutralize and collect alkaline and acid wastes and dispose of off Owner's property.

E. Dispose of runoff from chemical operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

3.3 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT

A. Comply with the following procedures while performing work with heat-generating equipment, including welding, cutting, soldering, brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:

1. Obtain Owner's approval for operations involving use of open-flame or welding equipment.

    a. Notification shall be given for each occurrence and location of work with heat-generating equipment.

2. As far as practical, use heat-generating equipment in shop areas or outside the building.
3. Before work with heat-generating equipment commences, furnish personnel to serve as a fire watch (or watches) for location(s) where work is to be performed.
4. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
5. Remove and keep the area free of combustibles, including, rubbish, paper, waste, etc., within area of operations.

    a. If combustible material cannot be removed, provide fireproof blankets to cover such materials.

6. Where possible, furnish and use baffles of metal or gypsum board to prevent the spraying of sparks or hot slag into surrounding combustible material.
7. Prevent the extension of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
8. Inspect each location of the day's work not sooner than 30 minutes after completion of operations to detect hidden or smoldering fires and to ensure that proper housekeeping is maintained.

3.4 HISTORIC TREATMENT PROCEDURES

A. The principal aim of preservation work is to halt the process of deterioration and stabilize the item's condition, unless otherwise indicated. Repair is required where specifically indicated. The following procedures shall be followed:

1. Retain as much existing material as possible; repair and consolidate rather than replace.
2. Use additional material or structure to reinforce, strengthen and support existing material or structure.
3. Use reversible processes wherever possible.
4. Use traditional replacement materials and techniques.

B. Prohibit smoking by personnel performing work on or near historic structures.

C. Obtain Architect's review and written approval in the form of a Constructive Change Directive or Supplemental Instruction before making changes or additions to construction or removing historic materials.

D. Notify Architect of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

E. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to the approval of Architect.

F. Where Work requires existing features to be removed, cleaned, and reused, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

G. When cleaning, match samples of existing materials that have been cleaned and identified for acceptable cleaning levels. Avoid overcleaning to prevent damage to existing materials during cleaning.

END OF SECTION 01 35 91

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. See Division 01 Section "Contract Summary" for division of responsibilities for temporary facilities and controls.

1.2 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Water Service Provide connections and extensions of services as required for construction operations.

C. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and storage areas for construction personnel.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber and Plywood: Comply with requirements in Division 06 Section **Rough Carpentry**.

B. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC:

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Toilets: Use of Owner's existing toilet facilities will not be permitted.

2. Contractor shall submit proposed location of Temporary Sanitary Facilities for approval by Owner prior to installation.

D. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

E. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and that is suitable for the occupancy of the space.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 for progress cleaning requirements.

C. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

D. Temporary Stairs: Provide temporary stairs where ladders are not adequate.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Security Enclosure and Lockup: Install substantial temporary enclosure around areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

D. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from other construction operations, and similar activities.

E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Smoking is prohibited in **all** areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. At areas requiring shoring prior to cutting/removal the Contractor shall be responsible for all structural calculations and shoring plans.

C. See Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.2 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 5 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
5. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

1. Obtain Architect’s approval prior to cutting and patching structural elements not explicitly indicated in the Contract Documents.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in

reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.4 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. See Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

C. See Divisions 02 through 14 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following:

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, final certifications, and similar documents.
4. Deliver extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
5. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
6. Complete final cleaning requirements, including touchup painting.
7. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, OWNER'S REPRESENTATIVE will either proceed with inspection or notify Contractor of unfulfilled requirements. OWNER'S REPRESENTATIVE will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by OWNER'S REPRESENTATIVE, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."

2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element.

1.5 WARRANTIES

A. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties in loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
3. Remove tools, construction equipment, machinery, and surplus material from Project site.
4. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be saved or reused.

B. See Section 007200 – General Conditions for disposal requirements of demolished materials.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

B. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.

C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Pre-demolition Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

A. Owner and public will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Hazardous materials are present in construction to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities within demolition area have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

F. Monitor the Work as it progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or

grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. The use of cutting torches and flame-cutting operations is prohibited.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Store items in a secure area until delivery to Owner.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 02 42 96 – HISTORIC REMOVAL AND DISMANTLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment procedures in the form of special types of selective demolition work for designated historic areas, and surfaces.

B. Related Requirements:
1. Section 013591 "Historic Treatment Procedures" for general Historic Treatment Requirements.
2. Salvage of existing items to be saved or reused.

C. See Section 007200 – General Conditions for disposal requirements of demolished materials.

1.2 DEFINITIONS

A. Dismantle: To disassemble or detach a historic item from a surface, or a non-historic item from a historic surface, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

B. Existing to Remain: Existing items that are not to be removed or dismantled, except to the degree indicated for performing required Work.

C. Remove: To take down or detach a non-historic item located within a historic space, area, or room, using methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

D. Retain: To keep existing items that are not to be removed or dismantled.

E. Salvage: To protect removed or dismantled items and deliver them to Owner ready for reuse].Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

1.3 PRECONSTRUCTION MEETINGS

A. Preconstruction Conference(s): Conduct conference(s) at [Project site]

1. Review minutes of Preliminary Historic Treatment Conference that pertain to removal and dismantling procedures and protection of historic areas and surfaces.
2. Review list of items indicated to be salvaged.
3. Review methods and procedures related to removal and dismantling work.
4. Review fire prevention.

1.4 INFORMATIONAL SUBMITTALS

A. Qualifications Data: For historic removal and dismantling specialist.

B. Preconstruction Documentation: Show pre-existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's removal and dismantling operations.

C. Removal and Dismantling Historic Treatment Program: Submit 14 days before work begins.

D. List of Items Indicated to Be Salvaged: Prepare a list of items indicated on Drawings to be salvaged for Owner's use or for reinstallation. Submit 15 days before construction conference.

E. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.

1.5 QUALITY ASSURANCE

A. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is insufficient experience for historic removal and dismantling work.

B. Removal and Dismantling Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of removal and dismantling work, including protection of surrounding and substrate materials and Project site.

C. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Before removal and dismantling, Owner will remove the following items:

1. All planters from terraces.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

D. Hazardous Materials: Hazardous materials are present in construction affected by removal and dismantling work. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.

2. Do not disturb hazardous materials or items suspected of containing hazardous materials, except under procedures specified elsewhere in the Contract Documents.

3. If unanticipated asbestos is suspected, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Reassign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.

E. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work.

1. Verify that affected utilities are disconnected and capped.

2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage. Enter this information on the submittal of inventory of salvaged items.

END OF SECTION 02 42 96

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes.

1.2 SUBMITTALS

A. Product Data: For each manufactured material and product indicated.

B. Design Mixes: For each concrete mix indicated.

C. Shop Drawings: Include details of steel reinforcement placement including material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports.

D. Material **test reports**.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

B. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.

1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
2. Formwork and form accessories.
3. Steel reinforcement and supports.
4. Concrete mixtures.
5. Handling, placing, and constructing concrete.

C. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Formwork: Furnish formwork and form accessories according to ACI 301.

B. Steel Reinforcement:

1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.

2. Plain-Steel Wire: ASTM A 82, as drawn.
3. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
4. Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.

C. Concrete Materials:

1. Portland Cement: ASTM C 150, Type **I**
2. Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 1-1/2-inch nominal size.
3. Water: Complying with ASTM C 94.

D. Curing Materials:
1. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf.
2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
3. Water: Potable.

2.2 CONCRETE MIXES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:

1. Compressive Strength (28 Days): **4000 psi (27.6 MPa)**.
2. Slump: 4 inches (100 mm).

2.3 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with ASTM C 94

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. increase mixing time by 15 seconds for each additional 1 cu. yd.

C. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Formwork: Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.

B. Vapor Retarder: Install, protect, and repair vapor-retarder sheets according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.
2. Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch

C. Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

D. Joints: Construct joints true to line with faces perpendicular to surface plane of concrete.

1. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by Architect.
2. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

    a. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

    a. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

E. Tolerances: Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.2 CONCRETE PLACEMENT

A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

B. Do not add water to concrete during delivery, at Project site, or during placement.

C. Consolidate concrete with mechanical vibrating equipment.

3.3 FINISHING FORMED SURFACES

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, or painting.
2. Apply **smooth-rubbed** finish, defined in ACI 301, to smooth-formed finished concrete.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.4 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on the surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied membrane roofing.

3.5 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions occur before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

D. Cure formed and unformed concrete for at least seven days as follows:

1. Moisture Curing: Keep surfaces continuously moist with **cover, water saturated and kept continuously wet**.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Tests will be performed according to ACI 301.

1. Testing Frequency: One composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. but less than 25 cu. Yd or fraction thereof.

END OF SECTION 03300

SECTION 04 01 20 - MAINTENANCE OF UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes maintenance of unit masonry consisting of brick masonry restoration and cleaning as follows:

1. Repointing joints at brick masonry as noted on Drawings and Allowances.
2. Brick masonry replacement at select areas.
3. Cleaning exposed unit masonry surfaces.

B. See Division 04 Section “Masonry Mortar” for masonry mortar.

1.2 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Division 01 Section "Unit Prices."

1.3 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

1.4 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on masonry units as follows.
1. Existing Mortar: Test according to ASTM C 295, modified as agreed by testing service and Architect for Project requirements, to determine proportional composition of original ingredients, sizes and colors of aggregates, and approximate strength. Use X-ray diffraction, infrared spectroscopy, and differential thermal analysis as necessary to supplement microscopical methods. Carefully remove existing mortar from within joints at five (5) locations designated by Architect.
2. Temporary Patch: As directed by Architect, provide temporary materials at locations from which existing samples were taken.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each exposed product and for each color and texture specified.

1.6 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry is not sufficient experience for masonry restoration work.

1. At Contractor's option, work may be divided between two specialist firms: one for cleaning work and one for repair work.
2. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress.

B. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units or approximately 24 inches (1200 mm) in least dimension. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

a. Replacement: **Four** brick units replaced.

2. Re-pointing: Prepare three (3) sample areas, each approximately 24 inches high by 24 inches wide for each type of re-pointing required.
3. Cleaning: Clean an area approximately 4 sq. ft. for each type of masonry and surface condition.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Common Brick: Provide common brick complying with ASTM C 62, Grade SW where in contact with earth, Grade SW, MW, or NW for concealed backup; and of same vertical dimension as face brick, for masonry work concealed from view. Color, size and texture to match existing.

2.2 MORTAR MATERIALS

A. See Division 04 Section “Mortar” for mortar products.

2.3 MORTAR MIXES

A. See Division 04 Section “Mortar” for mortar products.

2.4 MANUFACTURED REPAIR MATERIALS

2.5 REINFORCEMENT

A. Masonry Joint Reinforcement: ASTM A 951; stainless steel wire for exterior walls.

1. Material: Stainless steel wire; ASTM A 580, Type 304
2. Wire Size for Side Rods: W2.8 or 0.188-inch diameter.
3. Wire Size for Cross Rods: W2.8 or 0.188-inch diameter.
4. Spacing of Cross Rods: Not more than 16 inches o.c.
5. Single-Wythe Masonry: Truss- type with single pair of side rods, with at least 5/8-inch cover on each face.
6. Multiwythe Masonry: Truss- type with 1 side rod at each wythe of masonry 4 inches or less in width, plus 1 side rod at each face of masonry units more than 4 inches in width, with at least 5/8-inch cover on each face.

2.6 TIES AND ANCHORS

A. Masonry Ties:

1. Finishes: Stainless-steel sheet; ASTM A 240, Type 304.
2. Products:

a. Helifix North America, Corp., Helifix helical wall tie.
b. Blok-lok, Ltd., Spira-lok helical wall tie

B. Joint Stabilizing Anchors: Stainless-steel sleeve with two stainless-steel wires.

1. Finishes:

a. Stainless-steel sheet; ASTM A 240, Type 304.
b. Stainless-steel wire; ASTM A 580, Type 304.

2. Products:

a. Dur-O-Wall, Dayton Superior; DA 2200 Joint Stabilizing Anchor.
b. Hohmann & Barnard, Inc.; # “Slip-Set” Stabilizer.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.

1. Products:

a. Dur-O-Wall, Dayton Superior; DA 2015 Expansion Joint.
b. Hohmann & Barnard, Inc.; #NS Closed-cell Neoprene Sponge

2.8 CLEANING MATERIALS

A. Water: Potable.

B. Mild Acidic Cleaner: Manufacturer's standard mildly acidic cleaner containing no muriatic (hydrochloric), hydrofluoric, or sulfuric acid; or ammonium bifluoride or chlorine bleaches.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. PROSOCO; Enviro Klean BioWash.

b. PROSOCO; Enviro Klean Restoration Cleaner.

2.9 ACCESSORY MATERIALS

A. Temporary Protection Materials: Polyethylene sheeting, tapes, etc. as required.

2.10 CHEMICAL CLEANING SOLUTIONS

A. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical-cleaner manufacturer.

B. Acidic Cleaner Solution for Brick: Dilute with water to produce hydrofluoric acid content of 3 percent or less, but not greater than that recommended by chemical-cleaner manufacturer.

C. Acidic Cleaner Solution for Stone and Terra Cotta: Dilute with water to concentration demonstrated by testing that does not etch or otherwise damage stone or terra cotta surface, but not greater than that recommended by chemical-cleaner manufacturer.

D. Wash/neutralize cleaned surfaces with proper materials as required by manufacturer.

2.11 MORTAR MATERIALS

A. See Division 04 Section “Mortar” for mortar products.

2.12 MORTAR MIXES

A. See Division 04 Section “Mortar” for mortar products.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.

B. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical-cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. When no longer needed, promptly remove masking to prevent adhesive staining.
2. Keep wall wet below area being cleaned to prevent streaking from runoff.

3.2 BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.

E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed damaged brick with other removed brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size.

G. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

1. Maintain joint width for replacement units to match existing joints.

2. Use setting buttons or shims to set units accurately spaced with uniform joints.

H. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.). Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.3 CLEANING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.

    a. Equip units with pressure gages.

3. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

D. Water-Spray Application Method: Unless otherwise indicated, hold spray nozzle at least 6 inches from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush application. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

F. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of

rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

3.4 CLEANING MASONRY

A. Mild Acidic or Acidic Chemical Cleaning:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply cleaner to masonry by brush.
3. Allow cleaner to dwell on surface for period recommended by chemical-cleaner manufacturer or as established by mockup.
4. Rinse with cold water applied by low-pressure spray to remove chemicals and soil.
5. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once.

3.5 REPOINTING MASONRY

A. Rake out and re-point joints to the following extent:

1. All joints in areas indicated.

B. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of 2 times joint width to 2-1/2 times joint width, but not less than 3/4 inch or not less than that required to expose sound, un-weathered mortar.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.

    a. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet.

C. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

D. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a

uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.

    a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

E. Where re-pointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.6 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

END OF SECTION 04 01 20

SECTION 04 01 40 - MAINTENANCE OF STONE ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

A. All work shall be completed in such a way as to protect existing architectural features from damage and to retain as much historic fabric as possible, with a minimum of loss.

B. The work of this section consists of restoring the condition of the exterior stone work and the subsequent patching and replacement where required, to restore and preserve the stone masonry wall areas to a physically and historically compatible finish.

C. Section includes maintenance of stone assemblies consisting of stone restoration and cleaning as follows:

1. Sounding and patching of all stone areas where noted.
2. Repairing stone masonry including partial units (Dutchmen).
3. The removal of all inappropriate patching material.
4. The retooling of stone to match original all exposed stone surfaces to remain.
5. The patching of small cracks and holes in stone with restoration mortar.
6. Re-pointing stone masonry.
7. Cleaning all stone surfaces.

D. Related Requirements:

1. Work of this Section is affected by unit prices specified in Division 01 Section "Unit Prices."
2. Section 024296 "Historic Removal and Dismantling" for historic removal and dismantling work.
3. Section 040513 "Masonry Mortar".

1.02 ALLOWANCES

A. Allowances for historic masonry repair are specified in Section 012100 "Allowances."

1. Perform historic masonry repair work under quantity allowances and only as authorized. Authorized work includes work required by Drawings and Specifications and work as directed in writing by Architect.
2. Notify Architect weekly of extent of work performed that is attributable to quantity allowances.

B. Abandoned anchor removal is part of stone repair.

C. Partial stone replacement (dutchman repair) is part of partial stone replacement.

D. Patching stone units is part of masonry unit patching allowance.

1.03 UNIT PRICES

A. See 012200 for general project guidelines to be reviewed along with these specifications.

1. Unit prices apply to authorized work covered by quantity allowances.
2. Unit prices apply to additions to and deletions from Work as authorized by Change.

1.04 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on stone units as follows:

1. Existing Mortar: Test according to ASTM C 295, modified as agreed by testing service and Architect for Project requirements, to determine proportional composition of original ingredients, sizes and colors of aggregates, and approximate strength. Use X-ray diffraction, infrared spectroscopy, and differential thermal analysis as necessary to supplement microscopical methods. Carefully remove existing mortar from within joints at five (5) locations designated by Architect.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:

1. Include plans, elevations, sections, and locations of stone repair work on the structure.
2. Show partial replacement stone units (dutchmen).
3. Show provisions for flashing, lighting fixtures, conduits, and weep holes as required.
4. Show replacement and repair anchors, including drilled-in pins. Include details of anchors within individual stone units, with locations of anchors and dimensions of holes and recesses in stone required for anchors, including direction and angle of holes for pins.

C. Samples for Verification: For the following:

1. Each type of replacement stone. Include sets of Samples to show full range of color, texture, grain, veining, and finish to be expected. Provide sets of at least three 12-by-12- inch Samples for each type, but no fewer than necessary to indicate full range and the proportion of variations within range.
2. Each type of patching compound in form of briquettes, at least 3 inches long by 1-1/2 inches wide. Document each Sample with manufacturer and stock number or other information necessary to order additional material.
3. Each type of adhesive.
4. Accessories: Each type of anchor, accessory, and miscellaneous support.

1.06 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Engage an experienced stone restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry or new stone masonry is not sufficient experience for stone restoration work.

1. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that stone restoration and cleaning work is in progress.
2. Restoration Worker Qualifications: Persons who are experienced in restoration work of types they will be performing. When stone units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Stone Repair: Prepare sample areas for each type of stone indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

    a. Dutchmen Replacement: **Two** (2) stone units replaced.
    b. Retooling: **Two** (2) stone units retooled.
    c. Patching: **Two** (2) sections at least 4 inchs in diameter.

2. Repointing: Rake out joints in 2 separate areas each approximately 24 inches long for each type of repointing required and repoint one of the areas.
3. Cleaning: All cleaning products and repair methods used shall be based on results of a test area in an inconspicuous location working with the technical assistance of the product manufacturers to ensure compatibility with substrate and to avoid damage. Adjust concentrations and dwell times according to each material and condition.

    a. Obtain Architect's acceptance of visual qualities before proceeding with the work. Retain acceptable panels in undisturbed condition, suitably marked, during cleaning as a standard for judging completed work.

    b. Have manufacturer's representative present when the sample work is being done and when the sample work is being inspected for approval.

    c. Test adjacent non-marble materials for possible reaction with cleaning materials.

    d. Allow waiting period not less than 7 calendar days after completion of sample cleaning to permit study of sample panels for negative reactions.

C. Pre-installation Conference: Conduct conference at Project site.

1.07 PROJECT/SITE CONDITIONS

A. Protect and cover all adjacent architectural features and work completed by other trades.

PART 2 - PRODUCTS

2.01 STONE MATERIALS

A. General: Provide natural building stone of variety, physical properties, color, texture, grain, veining, finish, size, and shape to match existing stone.

B. Stone Dutchmen: Provide natural building stone of variety, physical properties, color, texture, grain, veining, finish, size, and shape to match existing stone.

1. For existing stone that exhibits a range of colors, texture, grain, veining, finishes, sizes, or shapes, provide stone that proportionally matches that range rather than stone that matches an individual color, texture, grain, veining, finish, size, or shape within that range.

C. STONE FABRICATION

1. Cut stone to produce pieces of thickness, size, and shape to match existing, including details on Drawings. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated.

2. Finish and/or carve exposed faces and edges of stone to match existing and approved samples and mockups.

3. Cut stones accurately to size, shape and dimensions and full to the square, with jointing as shown on Drawings. All exposed faces shall be dressed true. Beds and joints shall be at right angles to the face, and joints shall have a uniform thickness of 3/8 inch (9.5 mm) unless otherwise shown on Drawings.

4. Provide chases, reveals, reglets, openings and similar features as required to accommodate contiguous work.

5. Fabricate work, including washes and drips, to produce stone shapes having a uniform profile throughout their entire length and with precisely formed shapes slightly eased to prevent snipping, and matched at joints between units.

6. Reglets for flashing shall be cut in the stone where indicated on the drawings and or where required for a watertight assembly.

2.02 MORTAR MATERIALS

A. MORTAR MATERIALS - See Division 04 Section “Mortar” for mortar products.

2.03 MANUFACTURED REPAIR MATERIALS

A. Stone Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching stone.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Cathedral Stone Products, Inc.; Jahn Restoration Mortars.
   b. Edison Coatings, Inc.; Custom System 45.

2. Use formulation that is vapor- and water permeable (equal to or more than the stone), exhibits low shrinkage, has lower modulus of elasticity than the stone units being repaired, and develops high bond strength to all types of stone.
3. Formulate patching compound in colors, textures, and grain to match stone being patched.

B. Stone-to-Stone Adhesive: 2-part polyester or epoxy-resin stone adhesive with a 15- to 45-minute cure at 70 deg F, recommended by adhesive manufacturer for type of stone repair indicated, and matching stone color.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Two-Part Polyester or Epoxy-Resin Stone Adhesive:

      1) Akemi North America; MS76 Stone and Marble Adhesive.
      2) Bonstone Materials Corporation; Fast Set 41.
      3) Edison Coatings, Inc.; Flexi-Weld 520T.

   b. One-Part Cementitious Stone Adhesive:

      1) Cathedral Stone Products, Inc.; Jahn Restoration Adhesive.

2.04 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Nonacidic Gel Cleaner: Manufacturer's standard gel formulation, with pH between 6 and 9, that contains detergents with chelating agents and is specifically formulated for cleaning masonry surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. PROSOCO; Heavy Duty Restoration Cleaner.

D. For removal of Built-up Stains: Use thixotropic alkali materials, such as "Sure Klean" liquid stone cleaner, or "Sure Klean" T-942 stone cleaner (ProSoCo, Inc.), or approved equal.

E. Biogrowth inhibitor: BioKlean, as manufactured by ProSoCo

2.05 ACCESSORY MATERIALS

A. Stone Anchors and Pins: Type and size indicated or, if not indicated, to match existing anchors in size and type. Fabricate anchors and pins from Type 304 stainless steel.

B. Setting Buttons: Resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials.

C. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film forming, strippable masking material for protecting glass, metal and polished stone surfaces from damaging effect of acidic and alkaline masonry cleaners, such as "Sure Klean Acid Stop" (ProSoCo, Inc.), "Diedrich Acid Guard" (Diedrich Chemicals), or approved equal.

D. Plastic for covering poultice

2.06 MORTAR MIXES

A. MORTAR MIXES - See Division 04 Section “Mortar” for mortar product

PART 3 - EXECUTION

3.01 PROTECTION

A. Protect person and surrounding surfaces of building being restored and building site from harm resulting from stone restoration work.

B. Prevent grout or mortar used in re-grouting and repair work from staining face of surrounding marble and other surfaces. Remove immediately grout and mortar in contact with exposed stone and other surfaces.

C. Provide temporary rain drainage during work to direct water away from building.

3.02 STONE REPAIR, GENERAL

A. Repair Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from 10 feet away by Architect. Appearance will vary on individual stones, and should be matched to existing remaining portions of stone.

3.03 STONE-FRAGMENT REPAIR

A. Carefully remove cracked or fallen stone fragment. Reuse only stone fragment that is in sound condition.

B. Remove soil, loose particles, mortar, and other debris or foreign material, from fragment surfaces to be bonded and from parent stone where fragment had broken off, by cleaning with stiff-fiber brush.

C. Concealed Pinning: Before applying adhesive, prepare for concealed mechanical anchorage consisting of 1/4-inch- diameter, threaded stainless-steel pins set into 1/4-inch- diameter holes drilled into parent stone and into, but not through, the fragment. Center and space pins between 3 and 5 inches apart and at least 2 inches from any edge. Insert pins at least 2 inches into parent stone and 2 inches into fragment, but no closer than 3/4 inch from exposed face of fragment.

D. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of fragment and parent stone, completely filling all crevices and voids.

E. Fit stone fragment onto parent stone while adhesive is still tacky and hold fragment securely in place until adhesive has cured. Use shims, clamps, wedges, or other devices as necessary to align face of fragment with face of parent stone.

F. Clean adhesive residue from exposed surfaces and patch chipped areas.

3.04 STONE PATCHING

A. Remove deteriorated material and remove adjacent material that has begun to deteriorate. Carefully remove additional material so patch will not have feathered edges but will have square or slightly undercut edges on area to be patched and will be at least 1/4 inch thick, but not less than recommended by patching compound manufacturer.

B. Mask adjacent mortar joint or rake out for repointing if patch will extend to edge of stone unit.

C. Mix patching compound in individual batches to match each stone unit being patched.

D. Brush-coat stone surfaces with slurry coat of patching compound according to manufacturer's written instructions.

E. Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.

1. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of the stone. Shape and finish surface before or after curing, as determined by testing, to best match existing stone.
2. Carved Details: Build patch up 1/4 inch (6 mm) above surrounding stone and carve surface to match adjoining stone after patching compound has hardened.

F. Keep each layer damp for 72 hours or until patching compound has set.

G. Remove and replace patches with hairline cracks or that show separation from stone at edges, and those that do not match adjoining stone in color or texture.

3.05 REPOINTING STONEWORK

A. Rake out and repoint joints to the following extent:
1. Joints where mortar is missing or where they contain holes.
2. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.
3. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
4. Joints, other than those indicated as sealant-filled joints, where they have been filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of 2-1/2 times joint width, but not less than 1/2 inch.
2. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of stone units or widen joints. Replace or patch damaged stone units as directed by Architect.

    a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing stone has worn or rounded edges, slightly recess finished mortar surface below face of stone to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed stone surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

    a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.06 Where repointing work precedes cleaning of existing stone, allow mortar to harden at least 30 days before beginning cleaning work.

3.07 CLEANING STONE, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Use only those cleaning methods indicated for each stone material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging stone surfaces.

D. Chemical-Cleaner Application Methods: Apply chemical cleaners to stone surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush application. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

E. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

F. Sponge rinse the surface thoroughly using fresh, clear water. Change the rinse water frequently.

G. Remove waste water as work progresses by wet vacuum or other appropriate means. Do not allow water to pond on the floor.

3.08 PRELIMINARY CLEANING

A. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, caulking and wax.

1. Carefully remove heavy accumulations of material from surface of stone with sharp chisel. Do not scratch or chip stone surface.
2. Remove paint and calking with alkaline paint remover.
   a. Repeat application up to two times if needed.

3.09 CLEANING STONEWORK

A. Nonacidic Gel Chemical Cleaning:

1. Wet stone with **hot** water applied by low-pressure spray.
2. Apply nonacidic gel cleaner in 1/8-inch thickness by brush, working into joints and crevices. Apply quickly and do not brush out excessively so area will be uniformly covered with fresh cleaner and dwell time will be uniform throughout area being cleaned.
3. Let cleaner remain on surface for period as established by mockup.
4. Remove bulk of nonacidic gel cleaner by squeegeeing into containers for disposal.

5. Rinse with **cold** water applied by l**ow**-pressure spray to remove chemicals and soil.
6. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once.

B. Nonacidic Liquid Chemical Cleaning:

1. Wet stone with hot water applied by low-pressure spray.
   a. Apply cleaner to stone in two applications by brush. Let cleaner remain on surface for period as established by mockup.
2. Rinse with cold water applied by low-pressure spray to remove chemicals and soil.

C. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once.

3.010 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

END OF SECTION

SECTION 04 05 13 – MASONRY MORTAR

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes mortar for unit masonry assemblies as follows:

1. Re-pointing mortar.
2. Rebuilding (setting) mortar.
3. Grouting mortar at Bluestone curbstones.

B. See Division 04 Section “Maintenance of Unit Masonry” for re-pointing masonry joints.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM C 144, Specification for Aggregate for Masonry Mortar.
2. ASTM C 207, Specification for Hydrated Lime for Masonry Purposes.
3. ASTM C 270, Specification for Mortar for Unit Masonry.
4. ASTM C780 Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
5. ASTM C1148, Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar

1.3 SUBMITTALS

A. Product Data: For each type of mortar including cement, hydrated lime, sand and coloring admixtures (if any).

B. Samples: Submit cured samples of colored mortar to Architect for initial review.

C. Manufacturer’s Certificate: Certify that products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Cementitious materials, aggregates and coloring admixtures are to be blended and packaged under factory controlled conditions, requiring only the addition of water on site.

B. Single-source all cement, lime, aggregates and coloring admixtures to assure maximum consistency.

C. Mock-Up: Before starting work, prepare and repoint a sample area of not less than 10 feet high and 10 feet long using the procedures, proposed colors and texture, finish and workmanship for approval by the Architect.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver prepackaged, dry-blended mortar mix to project site in clearly labeled plastic lined bags each bearing the name and address of the manufacturer, production coeds or batch numbers and color or formula numbers.

B. Store mortar off the ground and in accordance with manufacturer's instructions to prevent contamination by foreign materials. Maintain packaged materials in a clean, dry state, protected against weather, traffic and foreign materials.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements

1. When ambient air temperature is below 40 degrees F, heat mixing water to maintain mortar temperature between 40 and 120 degrees F until placed. If necessary, store materials in a heated area to allow mortar temperatures to remain above 40 degrees F throughout the placement and finishing cycle.
2. Subject to written approval of the mortar manufacturer, and in accordance with their written dosage instructions, add the recommended quantity and type of non-chloride accelerating admixture when temperatures are below 32 degrees F.

B. Hot Weather Requirements

1. Under hot, dry and windy conditions use proper pre-dampening, protection and moist curing procedures as required to keep mortar moist for 72 hours following final tooling.

PART 2 - PRODUCTS

2.1 PREBLENDED MORTAR MIXES

A. SPEC-JOINT 46 Prepackaged Mortar Mix as manufactured by Edison Coatings, Inc., Plainville, CT Telephone: (800) 697-8055.

B. SPEC MIX Preblended Mortar Mix as manufactured by SPEC MIX, Inc., Eagan, MN 55121; Telephone: (888) 773-2649.

2.2 MORTAR ADDITIVE *(To be used only at bluestone curbstones.)*

A. Polymeric Admixture: Ice Minus 9 (RL-9) as manufactured by Edison Coatings, Inc., Plainville, CT Telephone: (800) 697-8055.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I, white or gray or both where required for color matching of existing mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S, incorporated as a finely divided powder in uniform particle size, free of lumps, flakes or other inconsistencies.

C. Mortar Aggregates: ASTM C 144 natural sand blend, rounded to sub-angular in shape, washed, screened and dried, with zero or near zero -270 crystalline silica content unless otherwise indicated.

1. Color: Provide natural sand blend to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible while remaining in compliance with ASTM C 114 grading and soundness requirements. Blend several sands if necessary to achieve suitable match.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes, meeting the requirements of ASTM C 797, at level not to exceed 10% of cement weight, except for carbon black, which may not exceed 2% of cement weight. Use only pigments with a record of satisfactory performance in masonry mortars.

E. Admixtures: Do NOT use admixtures without the express written consent of the Architect.

1. Do NOT use calcium chloride in any mortar.
2. Admixtures containing more than 0.1% chloride ions are NOT permitted.

F. Water: Potable, free of deleterious quantities of materials that may affect mortar performance or appearance.

2.4 MORTAR MIXES

A. All mortar shall be pre-blended, pre-colored and pre- packaged under controlled factory conditions. All ingredients are to be batched within plus or minus 1% accuracy, except pigments that shall be weighed to a precision of 0.01% accuracy.

1. Mortar shall conform to the minimum property requirements given in Table II of ASTM C 270, based on 28-day laboratory testing ONLY. Mortar type shall be as selected, based on the following criteria:

a. For general re-pointing of walls, use Type N (750 PSI min.).
b. For re-pointing of softer masonry or masonry where original mortar design mix was Type O, use Type O (350 PSI min.).
c. For re-pointing of historic masonry or structures constructed with low strength brick or sandstone, use Type K, (High lime mortar).

d. "All Lime" Mortar: No Portland cement in mix; for masonry buildings constructed prior to 1900 and incorporating lime mortars without Portland or other cement.
e. For rebuilding (setting) mortar, use same as pointing mortar.

B. Thoroughly mix mortar in quantities needed for immediate use, using mechanical mortar mixer or paddle mixer. Add approximately half the required water and mix mortar for a minimum of 5 minutes, and then slowly add water as needed to reach the desired working consistency. Do not exceed mix time of 10 minutes.

C. Add only clean, potable water at the project site. Do not add cement, lime, bonding agents, coloring admixtures, set accelerators, plasticizers, air entraining admixtures or other materials unless specifically authorized in writing.

D. Use a batch type mixer in accordance with ASTM C270, Subparagraph 6.3.

E. Use mortar within one hour of final mixing; after which unused mortar is to be discarded. This period must be reduced to 30 minutes in hot weather. Re-tempering is allowed only in accordance with ASTM C 270, Subparagraph 6.4, if it is demonstrated that re-tempering does not affect color consistency. Do not re-temper or use partially hardened material.

PART 3 - EXECUTION

3.1 See Division 04 Section "Maintenance of Unit Masonry" for re-pointing masonry joints.

END OF SECTION 04 05 13

SECTION 04 20 00 - BRICK MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:

1. Face brick.
2. Building (common) brick.

B. See Division 04 Section "Maintenance of Brick Masonry" for re-pointing joints at brick masonry and cleaning brick masonry.

C. See Division 04 Section "Mortar" for masonry mortar.

D. See Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.

E. See Division 07 Section "Modified Bituminous Sheet Flashing" for embedded membrane and flashing products.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for each type and color of exposed masonry units.

1.3 QUALITY ASSURANCE

A. Mock-ups: Prepare mockups to verify selections made under sample submittals and demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Prepare sample areas for each type of exposed brick masonry. If not otherwise indicated, size each mockup approximately 24 inches high by 24 inches. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work.

1.4 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

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. Products: Subject to compliance with requirements, provide one of the products specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 COLORS, TEXTURES, AND PATTERNS

A. Exposed Masonry Units: Match existing.

2.3 BRICK MASONRY MATERIALS

A. General: Provide shapes indicated and as follows:

1. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: ASTM C 216, Grade SW, Type FBX.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 6400 psi.
2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Size (Actual Dimensions): Match existing.

C. Building (Common) Brick: ASTM C 62, Grade SW.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 6400 psi.
2. Size: Match size of face brick.

2.4 MORTAR MATERIALS

A. See Division 04 Section "Mortar" for mortar products.

2.5 MORTAR MIXES

A. See Division 04 Section "Mortar" for mortar products.

2.6 REINFORCEMENT

A. Masonry Joint Reinforcement: ASTM A 951; stainless steel wire for exterior walls.

1. Material: Stainless steel wire; ASTM A 580, Type 304
2. Wire Size for Side Rods: W2.8 or 0.188-inch diameter.
3. Wire Size for Cross Rods: W2.8 or 0.188-inch diameter.
4. Spacing of Cross Rods: Not more than 16 inches o.c.
5. Single-Wythe Masonry: Ladder- type with single pair of side rods, with at least 5/8-inch cover on each face.
6. Multiwythe Masonry: Ladder- type with 1 side rod at each wythe of masonry 4 inches or less in width, plus 1 side rod at each face of masonry units more than 4 inches in width, with at least 5/8-inch cover on each face.

2.7 TIES AND ANCHORS

A. Masonry Ties:

1. Finishes: Stainless-steel sheet; ASTM A 240, Type 304.
2. Tie size: Unless otherwise indicated, size ties to extend at least halfway through veneer but at least 5/8-inch cover on outside face.
3. Products:

a. Helifix North America, Corp., Helifix helical wall tie.
b. Blok-lok, Ltd., Spira-lok helical wall tie

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.

1. Products:

a. Hohmann & Barnard, Inc.; #NS Closed-cell Neoprene Sponge

2.9 MASONRY CLEANERS

A. See Division 04 Section "Maintenance of Brick Masonry" for cleaning brick masonry.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required, cut units with motor-driven saws; provide clean, sharp, un-chipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns and offsets. Avoid using less-than half-size units, particularly at corners, jambs and where possible at other locations.

C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

D. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

E. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

3.2 BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.

E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed damaged brick with new brick matching existing brick, including size.

G. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

1. Maintain joint width for replacement units to match existing joints.

H. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for re-pointing existing masonry, and at same time as re-pointing of surrounding area.

3.3 MORTAR BEDDING AND JOINTING

A. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.4 CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Protect adjacent surfaces from contact with cleaner.
2. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
3. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

END OF SECTION 04 20 00

SECTION 04 44 00 – STONE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of stone paving:

1. Stone replacement units for bluestone paving. Where existing bluestone slabs are designated to be relaid, it is the intent of this section to preserve as much of the existing bluestone flags as possible and re-establish their original joint patterns. This shall be accomplished by relaying the existing bluestone flags and to furnish new bluestone flags, which match the existing, only as need to replace missing or existing damaged flags.

2. The Fabrication and installation of a new bluestone step and lighthouse entry door.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 01 40 – Maintenance of Stone Assembles

C. Section 04 05 13 – Masonry Mortar

D. Section 07 92 00 – Joint Sealants

1.3 DEFINITIONS

A. ACI – American Concrete Institute (www.concrete.org).

B. ASTM – American Society for Testing and Materials (www.astm.org).

C. ILIA – Indiana Limestone Institute of America (www.iliai.com).

1.4 REFERENCE STANDARDS

A. ASTM C97/C97 - Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone; 2015.

B. ASTM C99/C99M - Standard Test Method for Modulus of Rupture of Dimension Stone; 2015.

C. ASTM C150/C150M – Standard Specification for Portland Cement; 2016.

D. ASTM C170/C170M - Standard Test Method for Compressive Strength of Dimension Stone; 2016.

E. NYC Dept. of Transportation Standard Highway Specifications - Volume II: Supplemental Construction Methods – Section 6.07 – Bluestone Flags.

1.5 SUBMITTALS

A. Product Data: For each variety of stone, stone accessory, and other manufactured products indicated.

B. Stone Samples: Sets for each color, grade, finish, and variety of stone required; not less than 6 inches square.

1. Sets of samples to represent range of variations in color and finish as expected in completed work.

C. Material Test Reports: From a qualified independent testing agency, as follows:

1. Stone Test Reports: For each stone variety proposed for use on Project, provide test data indicating compliance with required physical properties, other than abrasion resistance, according to referenced ASTM standards. Base reports on testing done within previous five years.

D. Shop Drawings: Prior to any work, the Contractor shall submit Shop Drawings to the Architect for approval. These Shop Drawings shall show in detail the entire proposed bluestone pattern, with all joint lines and dimensions of each individual flag shown, within each block where bluestone flags are designated to be relaid or laid. Drawings are to clearly show which existing flags are to be relaid in their existing position, or relaid elsewhere, which flags are to be resized and relaid, and which flags are to be new bluestone furnished and laid. All proposed recessed lights shall be shown with dimensioned cut-outs in the bluestone. Filler pieces ("Dutchmen") where required are to be shown.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Stone Supplier: Firm with ten (10) years of experience specializing in cutting the required kind and type of stone.

2. Installer: Firm with five (5) years of experience specializing in installing cut stone.

B. Source Limitations for Stone: Obtain stone, regardless of finish, from a single quarry.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

D. Defects:

1. Do not use stone units with chipped arises, cracks, voids, stains, or other defects that will be visible in the finished Work.

2. Do not patch or hide defects. Remove defective stone units from the Site.

3. Architect will make sole determination on rejection of defective stones.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials and products in strict compliance with manufacturer's instructions, recommendations, and industry standards.

B. Store and handle stone and related materials to prevent deterioration and damage.

1. Do not use pinch or wrecking bars on stonework.

2. Lift stone using wide-belt type slings where possible; do not use wire ropes, or ropes containing tar or other substances that may cause staining.

3. Store stone on non-staining wood skids or pallets, and cover with non-staining, waterproof membrane.

4. Place and stack skids and limestone to distribute weight evenly and to prevent breakage or cracking of limestone.

5. Store cementitious materials above ground or floor, under cover, and in dry location.

1.8 PROJECT CONDITIONS

A. Protect stone masonry work during construction as follows:

1. Cover partially completed stonework while work is not in progress.

2. Extend cover at least 24 inches (610 mm) down both sides and hold securely in place.

3. Prevent staining of stone from mortar, grout, sealants, and other materials; immediately remove such materials from stone without damaging stonework.

4. Protect base of walls from rain-splashed mud and mortar splatter using approved coverings spread on ground and applied over wall surface.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 Replacement paving units at base of Lighthouse.

A. Bluestone: Complying with ASTM C629.

1. Absorption by Weight: 1.5% maximum after 48 hours; ASTM C97/C97M.
2. Density: 135 lbs/cu ft (2160 kg/cu m), minimum; ASTM C97/C97M.
3. Compressive Strength: 4000 psi (28 MPa), minimum; ASTM C170/C170M.
4. Abrasion Index: ASTM 241.

B. Thickness: 2 inch nominal.

C. Color: Blue/Gray to match existing.

D. Finish: Thermal surface finish (variation in smoothness not to exceed 1/8 inch), edges smooth sawn and a rubbed finish on the bottom.

2.2 Bluestone Curb.

A. Bluestone: Complying with ASTM C629.

1. Absorption by Weight: 1.5% maximum after 48 hours; ASTM C97/C97M.
2. Density: 135 lbs/cu ft (2160 kg/cu m), minimum; ASTM C97/C97M.
3. Compressive Strength: 4000 psi (28 MPa), minimum; ASTM C170/C170M.
4. Abrasion Index: ASTM 241.

B. Thickness: 8 inch nominal.

C. Color: Blue/Gray to match existing.

D. Finish: Thermal surface finish (variation in smoothness not to exceed 1/8 inch), edges smooth sawn and a rubbed finish on the bottom.

2.3 BASE MATERIAL:

A. Base material shall consist of limestone or traprock screenings, consisting of hard, durable, sharp-edged fragments, free from any deleterious matter, with 100% passing a 1/2” square-opening screen, 20% to 40% passing a No. 20 mesh sieve, and 5% to 15% passing a No. 200 mesh sieve. No recycled screenings will be accepted.

2.4 SETTING BED:

A. Setting bed shall be a minimum one (1”) inch thickness consisting of one (1) part Portland cement and seven (7) parts clean sand. Portland cement shall comply with the requirements of ASTM Designation C 150, for Type II or IIA cement. Sand shall meet the applicable requirements for Type 1A sand.

2.5 MORTAR MATERIALS

A. See Division 04 Section “Masonry Mortar” for mortar products.

2.6 MORTAR MIXES

A. See Division 04 Section “Masonry Mortar” for mortar products.

2.7 ANCHORS AND BACKUP STRUCTURE

A. Fabricate anchors from stainless steel, ASTM A 666, Type 304. Fabricate dowels and pins from stainless steel, ASTM A 276, Type 304.

2.8 STONE PAVER FABRICATION

A. Fabricate stone pavers in sizes and shapes as necessary and in compliance with requirements indicated on approved shop drawings.

B. Fabricate stone to thicknesses required in compliance with performance requirements, but not less than as shown on drawings.

C. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.

D. Cut stone to produce uniform joints 3/8 inch wide and as indicated.

PART 3 - EXECUTION

3.1 REMOVAL OF EXISTING PAVERS

A. The Contractor may not remove any existing bluestone from the site unless specifically approved by the Architect. All other sidewalk materials (concrete, asphalt, dirt, etc.) shall be excavated and disposed of away from the site, as necessary to install bluestone flags. Prior to removal of flags, the Contractor shall sawcut the existing joint lines between existing bluestone flags, as required, unless otherwise permitted. Flags to be relaid shall be carefully lifted by barring under an exposed edge or by other approved methods and, after removal, shall be stacked or stored on the site until such time as they are to be relaid at locations designated by the Architect. Barring at joints will not be permitted. Subsequent to the initial lifting by barring, all contact with the flag is to be by hand. All existing bluestone flags that are exposed, lifted or removed are to be inspected by the Architect. The Architect will make the final determination as to the suitability of existing bluestone flags for reuse.

3.2 EXAMINATION

A. Examine surfaces to receive stone pavers for defects that will adversely affect the execution and quality of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.3 PREPARATION

A. Just prior to setting stone, clean surfaces that support the Work of this Section.

B. Clean stone before setting by scrubbing with fiber brushes, followed by a thorough drenching with clear water. Use only mild cleaning solutions that contain no harsh or caustic abrasives or fillers.

C. If stone is not wet at time of setting, drench or sponge stone with clean water except do not wet expansion joint or control joint surfaces that require sealant.

3.4 FURNISHING AND PLACING BASE MATERIAL

A. Furnish and place a four inch (6") base layer of screenings on compacted subgrade, prior to laying flags.

B. After spreading, the screenings must be saturated with water and compacted to the satisfaction of the Architect.

3.5 SETTING STONE PAVERS, GENERAL

A. Execute stone paver installation by skilled mechanics and employ skilled stone fitters to do necessary field cutting as stone is set. Use power saws with diamond blades to cut stone.

B. Set stone to comply with requirements indicated on Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure dimension stone in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.

C. Existing flags that are to be relaid in specific patterns and broken flags that can be salvaged for re-use in the work shall be resized, by sawcutting as directed, and dressed so that joints will be square with the upper surface and free from feather edges, drill marks and tool marks.

D. Dampproofing for Stain Prevention: Where indicated on drawings, apply coatings of **bituminous dampproofing** to the back, beds, and joints of stones used at grade, and also dampproof adjacent **concrete** or **concrete masonry unit (CMU)** haunches, ledges, and support angles.

1. Dampproof joints only to within 1 inch (25.4 mm) of finished surfaces when using bituminous or asphaltic solutions.

2. Dampproof stones extending below grade as indicated above, and in addition provide dampproofing to grade level on face surfaces that are covered with grade material.

3. Exercise due care when handling dampproofed stone to avoid chipping or off-setting of stones.

3.6 SETTING STONE PAVERS WITH MORTAR

A. A setting bed mixture shall be placed over the base material. Then immediately prior to the laying of each flag, the setting bed mixture shall be sufficiently wetted and the flag firmly and evenly bedded to the required grade and pitch and brought to an even surface across joints. Then that flag shall be lifted to verify that full contact is made with the setting bed and any gaps shall be filled with additional wet bedding mixture, as may be required.

B. Embed ends of sills in mortar; leave remainder of joint open until final pointing.

C. Rake out joints for pointing with mortar to depths of not less than 1/2 inch. Rake joints to uniform depths with square bottoms and clean sides.

D. Point stone joints by placing pointing mortar in layers not more than 3/8 inch. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

E. Tool joints with a round jointer having a diameter 1/8 inch larger than width of joint, when pointing mortar is thumbprint hard.

F. Rake out mortar from sealant-pointed joints to depths of not less than 1/2 inch nor less than that required for sealant and sealant backing. Rake joints to uniform depths with square bottoms and clean sides.

3.7 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet or 1/4 inch in 20 feet or 1/2 inch maximum.

B. Variation from Level: For sills, copings, and other conspicuous lines, do not exceed 1/8 inch in 10 feet or 1/4 inch in 20 feet or 1/2 inch maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8” in 36 inches or one-forth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Stone Units (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16-inch.

3.8 ADJUSTING AND CLEANING

A. In-Progress Cleaning: Clean dimension stone as work progresses. Remove mortar fins and smears before tooling joints. Remove excess sealant and smears as sealant is installed.

B. Final Cleaning: After mortar is thoroughly set and cured, wash-down exposed masonry.

1. See Division 04 Section "Maintenance of Unit Masonry" for wash-down of new masonry.

END OF SECTION 04 44 00

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Furnish all labor and materials necessary to complete all work of this Section in accordance with the General Requirements, General Conditions, Drawings and all other requirements of the Contract Documents.

1.2 SUMMARY

A. Provide structural steel as per drawings. Include related anchors, fasteners, and connectors.
   1. New observation deck supports, grating and railing.
   2. New Spiral Stair support braces.
   3. Glass lantern structural supports for walls and roof.

B. Related Work:
   1. Section 055000 Metal Fabrications
   2. Section 099600 Painting

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Engineer structural-steel connections required by the Contract Documents to be selected or completed by fabricator to withstand design loadings indicated.

   1. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for structural-steel connections.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components, including connections, splices, holes, welds, and bolts.

   1. Include Shop Drawings and structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Mill test reports.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

B. Comply with applicable provisions of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

C. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category I, conventional steel structures.

D. Comply with applicable provisions in AISC's “Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" and RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. Preinstallation Conference: Conduct conference at Project site.

1.6 STORAGE AND PROTECTION

A. Store steel members off ground and protect steel members and packaged materials from erosion and deterioration.

B. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: **ASTM A 572/A 572M, Grade 50**.

B. Channels, Angles: **ASTM A 36/A 36M, Grade 50**.

C. Plate and Bar: **ASTM A 36/A 36M, Grade 50**.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade **B**, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: **Hot-dip zinc coating, ASTM A 153/A 153M, Class C**.

B. Threaded Rods: **ASTM A 36/A 36M**.

1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."

2.8 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and to prepare test reports. Comply with Part 3 "Field Quality Control" Article.

PART 3 - EXECUTION

3.1 ERECTION

A. Examination: Verify elevations of masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges".

C. Base and Bearing Plates: Clean masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
2. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

D. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.2 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

END OF SECTION 051200

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Metal spiral stair.
2. Railings and guards.

1.2 RELATED SECTIONS

A. See Division 05, Section 05120 - Structural Steel.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 09 90 00 - Painting and Coating.

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings for stairs and railings.

1. Include plans, elevations, and details.
2. Show connection and accessory items and locations for anchor and bolt installation.
3. Include design loads, structural calculations and material properties.
4. Shop drawings shall be signed and sealed by a structural engineer licensed in New York State.

B. Templates: For anchors and bolts.

C. Samples: For each type and finish of extruded tread.

D. Floor Grating: Submit erection plan.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm that has produced types of stair and railing systems required for not less than ten (10) years, with not less than five similar projects that have been successful use for not less than five years.

B. Installer Qualifications: Minimum five (5) years experience in successful installation of stair and railing systems of type specified.

C. Galvanizing: Stamp galvanized items with galvanizer's name, weight of coating, and applicable ASTM number.

1.5 REFERENCES

A. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2001a.

B. ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2001.

C. AWS D 1.1 - Structural Welding Code - Steel; 2002.

D. NAAMM AMP 510 - Metal Stairs Manual; 1992, Fifth Edition.

E. SSPC Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 1982 (Ed. 2000).

1.6 DELIVERY AND STORAGE

A. Coordinate delivery of anchor bolts and other anchorage devices to be built into other construction to avoid delay.

B. Promptly cover and protect steel items delivered to the site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. **Paragon Stairs**: 105 GP Clement Drive, Collegeville, PA 19426;
   Tel: 888-939-3778; Email: pandrews@paragonstairs.com; Web www.paragonstairs.com.
2. **Stairways, Inc**: 4166 Pinemont, Houston, TX 77018
   Tel.: 888-476-3354, Email: swinfo@stairwaysinc.com Web www.stairwaysinc.com
3. **FSI Industries**: 20 Technology Way, West Greenwich, RI 02817
   Tel.: 800-421-0314, Email: Contact@FSIndustries.com Web www.fsindustries.com

2.2 SPIRAL STAIRS

A. Spiral Stairs: Designed by stair manufacturer for applicable code requirements for live and dead loads, dimensions, and other requirements.

1. Type: Metal structure; designed in accordance with NAAMM Metal Stairs Manual
2. Stair Well: Octagon.
3. Stair: Round
4. Provide platforms with integral nosings matching tread nosings.
5. Provide well rail matching stair balusters and handrails around entire well opening.

B. Treads and Landings: Diamond plate.

1. Material: Galvanized steel.
2. Thickness: 12 gage.

3. Thickness: 3/16 inch (5 mm).

C. Treads and Landings: Grating

1. Pattern: Rectangular bar grating, 1 inch (25.4 mm) by 3/16 inch (4.8 mm).
2. Treads: Galvanized steel.
3. Landings: Galvanized steel.
4. Provide nosing on leading edge.

D. Handrails: Round.

1. Material: Galvanized steel.
2. Diameter: 1-1/2 inches (38 mm).

E. Balusters: Metal.

1. Material: Galvanized steel.
2. Cross-Section: 1 inch (25.4 mm) round.
3. Space balusters at 4 inches (102 mm) on center.

F. Center Column: Round metal pipe or tube.

1. Material: Galvanized steel.
2. Diameter: As indicated on drawings.
3. Base Plate: 10 inches (254 mm) square, 1/4 inch (6 mm) thick.
4. Column Cap: Match material and finish of column.

G. Stringers and Landing Framing:

1. Material: Same as tread materials.
2. Size and Shape: As required for compliance with performance requirements.
3. Provide connections and other components necessary for support and installation of stairs.

2.3 METALS

A. Ferrous Metals:

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
3. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
4. Steel Tubing: ASTM A 500, cold-formed steel tubing.
5. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
6. Slotted Channel Framing: Cold-formed metal channels complying with MFMA-3, 1-5/8 by 1-5/8 inches. Channels made from galvanized steel complying with ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.079-inch nominal thickness.

2.4 FASTENERS

A. General: Type **304** stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

2.5 MISCELLANEOUS MATERIALS

A. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

1. Tnemec Company, Inc.; Tneme-Zinc 90-97.

B. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for regalvanizing welds in steel.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

2.6 FABRICATION

A. General: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
2. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
4. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

B. Miscellaneous Framing and Supports: Provide steel framing and supports not specified in other Sections as needed to complete the Work. Fabricate units from steel shapes, plates, and bars of welded construction. Cut, drill, and tap units to receive hardware, hangers, and similar items.

C. STEEL PIPE RAILINGS AND HANDRAILS

1. Fabricate railings and handrails of 1-1/2-inch (nominal) diameter steel pipe, unless otherwise shown.
2. Railings: Unless otherwise shown, railings shall consist of top rail and intermediate rails, with posts spaced not more than 4 feet oc. Close ends of rails that do not terminate with a flange or continuous return.

a. Join posts, rails, and corners by one of the following methods:

1) Flush-type steel railing fittings, welded and ground smooth, with railing splice locks secured with 3/8 inch hexagonal-recessed-head setscrews.

2) Coped and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding joints smooth. Butt railing splices and reinforce by a tight-fitting interior pipe sleeve not less than 6 inches long secured in place.

b. Railings may be bent at corners instead of joining, provided the bends are uniformly formed in jigs, with cylindrical cross-section of pipe maintained throughout the entire bend.

c. Unless otherwise shown, fabricate railings and accessories as necessary to secure posts and rail ends to construction as follows:

1) Anchor posts to steel with steel flanges, angle type or floor type as required by conditions, welded to posts and bolted to the steel supporting members.
2) Anchor rail ends into concrete and solid masonry with round steel flanges welded to rail ends and anchored into the wall construction with expansion anchors.

3. Handrails: Pipe handrails shall be secured to walls by means of wall brackets, and shall have a wall return fitting at each end of handrails unless otherwise shown.

D. OBSERVATION DECK FLOOR GRATING

1. Grating: Rectangular, welded steel bar grating designed to support 200 lb/sq ft with deflection not exceeding 1/180. Fabricate with bearing bars on edge, and with all intersecting and abutting members joined by the electro-pressure welding method for the full depth of cross bar. Stainless Steel Bars:

a. Top Surface of Bearing Bars: Plain.
b. Toeplate: Flat steel bar curb secured to outer edge of grating where shown.

2.7 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.

B. Spiral Stair Finishes:

1. Hot-dip galvanize items as indicated to comply with ASTM A 123/A 123M .
2. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting," for shop painting.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are acceptable to suit stair assembly tolerances.

B. Verify supports and anchors are correctly and securely positioned.

C. Start of installation constitutes installer's acceptance of substrate and conditions.

3.2 INSTALLATION

A. General: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.

1. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.
2. Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
3. Provide temporary bracing or anchors in formwork for items that are to be built into, masonry or similar construction.

B. Set bearing and leveling plates on cleaned surfaces using wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts and pack solidly with non-shrink, nonmetallic grout.

C. Attached Work: Drill holes for fasteners with power tools to exact size required. Unless otherwise shown on the Drawings, fasten metal Work to concrete and solid masonry anchorage with expansion anchors. Fasten metal Work to hollow masonry and stud partitions with square head toggle bolts.

D. Railings: Adjust railings prior to securing in place to insure alignment and proper matching at joints. Plumb posts in each direction. Secure posts and rail ends to construction as follows:

1. Anchor posts to steel with steel flanges, angle type or floor type as required. Weld flanges to posts, and bolt to the steel supporting members.
2. Anchor rail ends to concrete and masonry with round steel flanges. Weld flanges to rail ends, and anchor into the wall construction with expansion anchors.

E. Grating: Secure grating to supporting members with saddle clip anchor assemblies, unless otherwise shown or specified.

F. Touch up surfaces and finishes after erection.

1. Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.
2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

G. Spiral stair installation:

1. Install in accordance with manufacturer's instructions and approved shop drawings.
2. Install stair assembly in accordance with manufacturer's instructions and approved shop drawings and in accordance with specified performance requirements.
3. Anchor components rigidly and securely to building structure, plumb and level, accurately fitted, and free from distortion or defects.
4. Fit exposed connections to form tight hairline joints.
5. Weld connections that cannot be shop welded because of size limitations.

a. Perform field welding of steel in accordance with AWS D 1.1. Field bolt and weld to match shop bolting and welding.
b. Clean field welds, bolted connections and abraded areas.
c. Touch up shop primer.
d. Repair galvanizing with galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05 50 00

SECTION 05 91 00 – CAST IRON RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of treatment of manufactured or handmade historic ornamental metalwork:

1. Dismantling and removing Cast Iron light stanchion at center of Lantern for off-site restoration and refinishing.
2. Removing coatings and corrosion.
3. Refinishing restored metal.
4. Reinstalling restored light stanchion.

B. See Section 01350 Historic Treatment Procedures for general project guidelines to be reviewed along with this procedure.

1.2 SUBMITTALS

A. Replacement Ornamental Metal Shop Drawings: Provide photographic survey prior to and following coating removal. Show fabrication and installation of repairs and replacement ornamental metal. Indicate materials and profiles of each duplicated ornamental metal member including fittings, joinery, finishes, fasteners, anchorages, and accessory items.

B. Product Certificates: For each type of product, submit certification that materials comply with referenced standards; signed by product manufacturer.

C. Sequencing and Scheduling: Submit sequence and scheduling of ornamental metal work.

D. Shop Drawings: Provide diagrammatic shop drawings indicating all elements to be removed, with catalogue identification number and required treatment.

E. Welding certificates.

1.3 QUALITY ASSURANCE

A. Mockups: Prepare mockups to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Locate mockups on the building where directed by Architect.
2. Ornamental Metal Repair: For each type of material indicated to be patched or replaced.
3. Cleaning Mockups: 4 sq. ft. (.375 sq. m) in area.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code--Sheet Steel."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Items Designated for Removal and Reinstallation: Pack, handle, and ship ornamental units and accessories that are indicated for removal and reinstallation. Pack in suitable packs or in heavy-duty cartons. Store items in dry storage facility until ready for treatment and reinstallation.

B. Replacement Items for Installation: Pack, handle, and ship replacement ornamental units and accessories packed in suitable packs or in heavy-duty cartons.

C. Deliver other materials, including repair and finishing materials, to Project site in manufacturer's original and unopened containers, labeled with description of contents and names of manufacturers.

1.5 PROJECT CONDITIONS

A. Protect surrounding surfaces of building from damage resulting from ornamental metal restoration work.

B. Prevent chemical cleaning and paint stripping solutions from coming into contact with other surfaces which could be injured by such contact.

C. Dispose of by-products from cleaning and paint stripping operations by legal means and in manner which prevents damage to other surfaces.

D. Perform historic treatment of ornamental metal work in the following sequence:

1. Stabilize existing deteriorating ornamental metal
2. Clean ornamental metal surfaces.
3. Remove deteriorated paint.
4. Remove or treat corrosion.
5. Repair existing ornamental metal, including patching, splicing, and reinforcing. Retain as much original material as possible.
6. Replace existing ornamental metal with new materials where noted.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Water Cleaning: Clean with water and bristle brush.

B. Job-Mixed Detergent Solution: Mix 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gal. of solution required.

C. Liquid Strippable Masking Agent: Liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from the damaging effects of acidic and alkaline cleaners.

2.2 COATING REMOVAL MATERIALS

A. Alkaline Paint Remover: Alkaline paste formulation for removing paint coatings from metals.

B. Chemical Strippers

1. Environmentally safe, water based paint strippers, free of flammable solvents and fumes, caustics and MUST NOT contain N Methyl Pyrrolidone (NMP). Products must work on epoxy paints, cementitious paints, exotic coatings, and oil-base coatings. Acceptable products available through PROSOCO; contact Technical Reps - Tel: 1-800-255-4255 website: www.prosoco.com.

2. Miscellaneous Equipment
   a. Stiff natural bristle brushes
   b. Soft clean rags
   c. Clean, potable water
   d. Rubber gloves
   e. Eye and skin protection
   f. Putty knives or paint scrapers, metal, and plastic.
   g. Airless Spray equipment with adjustable pressure (between 100-600 psi.) and a 0.19” or larger fan tip outfitted with chemical resistant packings. Titan 640i or larger pump or equal
   h. Standard Pressure washers with tip pressures no greater than 3600 psi at the tip.
   i. Wire Brush (for removing rust bloom only).

2.3 MISCELLANEOUS MATERIALS

A. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of metal to be welded or filled, complying with applicable AWS specifications, and as required for color match, strength, and compatibility in fabricated items.

1. Filler metal shall match as closely as possible existing metal to be filled.

B. Filler Crack Repair Material: Belzona 111 (Super Metal) Manufactured by Belzona Inc tel: (305) 594-4994. Email: belzona@belzona.com.
1. Two component paste grade system used to fill and or patch metal componenants.

C. Fasteners: Use fasteners of same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

1. Provide fasteners to match existing fasteners, in material and type of fastener.
2. Provide concealed fasteners for interconnecting ornamental metal components and for attaching them to other work.

3. Provide concealed fasteners for interconnecting ornamental metal components and for attaching them to other work unless exposed fasteners are unavoidable or exposed fasteners are the existing fastening method.
4. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

D. Anchors: Anchors of type indicated below, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.

E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

F. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

G. Sandpaper for Ferrous Metal Mechanical Cleaning: Aluminum oxide paper, emery paper, or fine steel wool.

H. Shop Primers: Provide primers complying with applicable requirements in Division 09 Section "Maintenance of Painting and Coating."

I. Sandpaper for Ferrous Metal Mechanical Cleaning: Aluminum oxide paper, emery paper, or fine steel wool.

2.4 FABRICATION, GENERAL

A. Form ornamental metal to match existing shapes and sizes, with true curves, lines, and angles. Provide components in sizes and profiles indicated to match existing ornamental metal.

B. Provide rebates, lugs, and brackets necessary to assemble units and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners to match existing work.

C. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.

D. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather to resist water penetration.

E. Provide castings that are sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

F. Finish castings to match existing ornamental metal work.

1. Make molds from original units to create new cast iron units.

G. Finish exposed surfaces to smooth, sharp, well-defined lines and as required to match existing work.

2.5 FINISHES

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Onsite Metal Cleaning: Prepare uncoated iron surfaces to comply SSPC-SP 3, "Power Tool Cleaning." Apply primer to uncoated surfaces of metal immediately after surface preparation.

D. Preparation for Shop Priming: Prepare uncoated iron surfaces to comply with minimum requirements indicated below for surface preparation of ornamental metal:

1. SSPC-SP 5, "White Metal Blast Cleaning."

2. Apply primer to uncoated surfaces of metal immediately after surface preparation.

PART 3 - EXECUTION

3.1 HISTORIC TREATMENT PROCEDURES, GENERAL

A. General: Treatment of historic items shall be based on minimal disturbance. Stabilize existing ornamental metal to reestablish weather resistance and structural integrity while maintaining the existing form of each item of ornamental metal. Stop the progress of deterioration and corrosion by removing deteriorated coatings and corrosion and reapplication of protective coatings. Repair items where stabilization is not sufficient to stop progress of deterioration. Repair items in place and retain as much original material as possible. Duplication and replacement of historic items shall be used only where indicated or scheduled.

1. Install temporary protective measures to stabilize existing ornamental metal that is scheduled to be completed later.

B. Corrosion: Remove and stabilize existing deteriorating corrosion. Use mechanical methods including scraping, wire brushing, or sanding. Use manual methods, including hand power tools, for corrosion removal.

1. Chemical Removal of Corrosion: Apply chemical corrosion remover where corroded spots are not accessible to mechanical methods.

C. Reapply Protective Coatings. Reapply protective coatings to prepared ornamental metal in compliance with Division 09 Section "Maintenance of Painting and Coating."

D. Repair Ornamental Metal Items: Match existing materials and features and repair existing work in place, retaining as much original material as possible to complete the repair.

1. Unless otherwise indicated, repair ornamental metals by patching, piecing-in, splicing, or otherwise reinforcing metals with new metal to match existing metal.
2. Where indicated, repair ornamental metal by limited replacement in kind.

3.2 OFF-SITE PAINT REMOVAL

1. Paint Removal with Abrasive Blasting: Remove paint from all metal surfaces.

3.3 CLEANING AND PAINT REMOVAL - GENERAL

A. PREPARATION

1. Protect adjacent surfaces with paper, drop cloths, and other means. Special protection of window, concrete mosaic ceiling, and other historic material should be applied.
2. When removing paint from metallic surfaces make sure surface has been mechanically cleaned free of rust with wire brush. Prime rusted areas as soon as possible to prevent recurrence of rust bloom. See Section 09900 PAINTING.

B. PAINT REMOVAL AND SURFACE PREPARATION

1. No work shall commence until methods and materials for each type of cleaning are approved by the owner's representative as determined by test panels. Repeat test panels as required to demonstrate means and methods to acceptable levels as determined by the owner's representative.
2. Pressure washing shall be at a pressure, which will not damage the surface, yet provide effective removal.
3. Personnel performing cleaning operations shall at adhere to the Personnel Protective Equipment (PPE) stipulated on the MSDS for products being used.
4. Exercise caution during cleaning operations to avoid wind drift of materials to adjacent properties. Persons, or cars below. Schedule cleaning operations for times or days when risk to pedestrians or vehicles is at a minimum.
5. Generally, treat surfaces by directing low pressure water washing over the surface as determined by test panels.
6. Use only methods and materials determined during testing phase and approved by owner's representative. Clean surface to degree accepted by owner's representative. Do not permit cleaning to continue if methods and materials employed results in any permanent damage to surfaces.
7. Do not proceed with surface preparation until proper protection has been installed for adjacent materials.
8. Contractor shall reclaim, characterize and dispose of all removed paint and stripper residue used in conjunction with this project in accordance with applicable laws.

C. CLEAN UP

1. During the work, remove from the site discarded cleaning and coating materials, rubbish, cans and rags at the end of each workday.

2. Upon completion of work, remove all protective coverings and coatings, and clean window glass and other spattered surfaces. Remove spattered coatings by proper methods as recommended by manufacturer, using care not to damage adjacent surfaces

3.4 REMOVAL, REPAIR, AND REINSTALLATION

A. Removal, General: Carefully detach items indicated to be removed from existing construction.

1. Tag and record location of each item removed and indicated to be salvaged or reinstalled.
2. Store ornamental metal indicated to be salvaged or reinstalled in a secure location.

B. Items Indicated "Remove and Reinstall": Carefully remove, repair, and clean items for reuse as indicated, and reinstall where indicated.

C. Items Indicated "Existing to Remain": Do not remove. Protect existing items to remain in place.

3.5 INSTALLATION

A. Provide anchorage devices and fasteners where necessary for securing to in-place construction.

B. Set products accurately in location, alignment, and elevation. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, with uniform reveals and spaces for sealants and joint fillers.

C. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

D. Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work.

3.6 ORNAMENTAL METAL SCHEDULE

A. Treatment for Cast Iron Light Stanchion:

1. Remove item completely and return to shop to perform indicated treatment of item.
2. Coating Removal: Abrasive blasting.
3. Corrosion Removal: Abrasive blasting.
4. Finish Treatment: Application of finish coating as specified in Division 09 painting Section.
5. After treatment, reinstall item.

END OF SECTION 05 91 00

SECTION 07 56 00 – FLUID - APPLIED MEMBRANE

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

A. The following specification outlines the requirements for a fully reinforced cold fluid-applied polyurethane liquid resin roofing and waterproofing membrane (with approved broadcast mineral aggregate surfacing or approved coating) and all other ancillary waterproofing work including but not limited to installation of penetration flashings, sealants and metal work as specified.

1.2 SUMMARY

A. New fluid applied membrane and granular surfacing at new cast concrete ring beam at base of Lantern.

1.3 SECTION INCLUDES

B. Adhered full fleece reinforced, cold fluid-applied, polyurethane liquid resin waterproofing membrane system including membrane, penetration flashings, base flashings, and expansion joints.

C. Substrate preparation, cleaning, leveling and patching

D. Temporary waterproofing and priming

E. Waterproofing membrane installation

F. Flashing installation and expansion joint installation

G. Protective surfacing

1.4 RELATED SECTIONS

A. Division 3 - Section “Cast-In-Place Concrete”

1.5 REFERENCES

A. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual.

1.6 SUBMITTALS FOR REVIEW

A. Membrane System Product Data: Provide current standard printed product literature indicating characteristics of membrane materials, flashing materials, components, and accessories product specification and installation.

B. Product Samples: Submit product samples of membrane and flashing materials showing color, texture, thickness and surfacing representative of the proposed system for review and approval by the Owners Representative.

C. Submit sample copies of both the Manufacturer and Applicator warranties for the periods stipulated. Each specimen must be a preprinted representative sample of the issuing company’s standard warranty for the system specified.

1.7 QUALITY ASSURANCE

A. Membrane Manufacturer: Company specializing in manufacturing fully reinforced cold fluid applied liquid resin waterproofing membrane systems with a minimum of ten (10) years of documented applications in the United States. Membrane Manufacturer shall submit the following certifications for review:

1. Substrates and conditions are acceptable for purpose of providing specified warranty.
2. Materials supplied shall meet the specified requirements.

B. Applicator: Company specializing in performing the work of this section with (3) years documented experience and **approved by system manufacturer for warranted membrane installation**. Applicator shall submit the following certification for review:

1. Applicator shall submit documentation from the membrane manufacturer to verify contractor's status as an approved applicator for warranted installations.

C. Evaluate moisture content of substrate materials. Constructor shall determine substrate moisture content throughout the work and record with Daily Inspection Reports or other form of reporting acceptable to the Owner or designated Representative, and Membrane Manufacturer.

D. Monitor quantities of installed materials. Monitor application of resin mixture, reinforcing fleece and flashing. Perform Work in accordance with manufacturer's instructions.

E. Mock-up areas shall be used to determine required methods and tools to obtain degree of substrate preparation required by the membrane manufacturer. Conduct tests as required to verify that substrate preparation meets specified requirements. Tests shall include, but are not limited to, tensile bond strength and moisture content of substrate.

1. Prepare and clean a three (3) foot (0.9 m) by three (3) foot (0.9 m) area of each substrate material type.
2. Submit findings in writing to Owner or his designated Representative and Membrane Manufacturer.
3. Mock-up areas shall be maintained for quality control for the entire project.

1.8 REGULATORY REQUIREMENTS

A. Conform to applicable building and jurisdictional codes for roofing/waterproofing assembly and fire resistance requirements.

B. Comply with requirements of OSHA, NIOSH or local governing authority for work place safety.

C. Comply with authority or agency "Confined Space Policy" during and throughout all work to be performed.

1.9 PRE-INSTALLATION MEETING

A. Convene a pre-installation meeting at the job site (1) week before starting work of this section. Require attendance of parties directly affecting work of this section, including but not limited to, Architect, Owner's Representative, Roofing/Waterproofing Contractor, and Membrane Manufacturer's Representative.

Review roofing/waterproofing preparation and installation procedures, coordination and scheduling required with related work, and condition and structural loading limitations of deck/substrate.

1.10 FIELD INSPECTION SERVICES

A. Manufacturer's technical representative shall provide the following inspections of the membrane application:

1. Job start inspection at the beginning of each phase of the project, to review special detailing conditions and substrate preparation.
2. Periodic in-progress inspections throughout duration of the project to evaluate membrane and flashing application.
3. Final punch-list inspection at the completion of each phase of the project prior to installation of any surfacing or overburden materials.
4. Warranty inspection to confirm completion of all punch list items, surfacing, and overburden application.

1.11 DELIVERY, STORAGE, AND PROTECTION

A. The Contractor together with the Owner or his designated Representative shall define a storage area for all components. The area shall be cool, dry, out of direct sunlight, and in accordance with manufacturer's recommendations and relevant regulatory agencies. Materials shall not be stored in quantities that will exceed design loads, damage substrate materials, hinder installation or drainage.

B. Store solvent-bearing solutions, resins, additives, inhibitors or adhesives in accordance with the MSDS and/or local fire authority. After partial use of materials replace lids promptly and tightly to prevent contamination.

C. Roll goods shall be stored horizontally on platforms sufficiently elevated to prevent contact with water and other contaminants. DO NOT use rolls that are wet, dirty or have damaged ends.

D. Roofing/waterproofing materials must be kept dry at all times. If stored outside, raise materials above ground or roof level on pallets and cover with a tarpaulin or other waterproof material. Plastic wrapping installed at the factory should **not** be used as outside storage covers.

E. Follow manufacturer's directions for protection of materials prior to and during installation. Do not use materials that have been damaged to the point that they will not perform as specified. Fleece reinforcing materials must be clean, dry and free of all contaminants.

F. Copies of all current MSDS for all components shall be kept on site. Provide any and all crew members with appropriate safety data information and training as it relates to the specific chemical compound he or she may be expected to deal with. Each crew member shall be fully aware of first-aid measures to be undertaken in case of incidents. Comply with requirements of OSHA, NIOSH or local governing authority for work place safety.

1.12 ENVIRONMENTAL REQUIREMENTS

A. Do not apply roofing/waterproofing membrane during or with the threat of inclement weather.

B. Application of cold fluid-applied reinforced polyurethane roofing/waterproofing

membrane may proceed while air temperature is between 40°F (5°C) and 85°F (30°C) providing the substrate is a minimum of 5°F above the dew point.

C. When ambient temperatures are at or expected to fall below 50°F (10°C), or reach 85°F (30°C) or higher, follow Membrane System Manufacturer's recommendations for weather related additives and application procedures.

D. Ensure that substrate materials are dry and free of contaminants. DO NOT commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials.

1.13 COORDINATION & PROTECTION

A. Coordinate the work with the installation of associated metal flashings, accessories, appurtenances, etc. as the work of this section proceeds.

B. Building components shall be protected adequately (with tarp or other suitable material) from soil, stains, or spills at all hoisting points and areas of application. Contractor shall be responsible for preventing damage from any operation under its Contract. Any such damage shall be repaired at Contractor's expense to Owner's satisfaction or be restored to original condition.

C. Provide barricades, retaining ropes, safety elements (active/passive) and any appropriate signage required by OSHA, NIOSH, and NSC and/or the Owner or designated Representative.

D. Protect finished roofing/waterproofing membrane from damage by other trades. Do not allow waste products containing petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, animal fat, etc. or direct steam venting to come into direct contact with the membrane.

1.14 WARRANTY

A. Manufacturer's Premier Warranty: **Provide twenty (20) year manufacturer's premier warranty** under provisions of this section. This warranty provides for cost of labor and materials for loss of watertightness, limited to amounts necessary to effect repairs necessitated by either defective material or defects in related installation workmanship, with no dollar limitation (“NDL”).

B. Waterproofing Contractor's Warranty: **Provide five (5) year "Applicator Maintenance Warranty"** covering workmanship for all work of this section including installation of membrane, flashings, metal work, and roofing/waterproofing accessories.

C. Submit (2) executed copies of both the manufacturer and applicator warranties for the periods stipulated, starting from the date of substantial completion. Each warranty must be signed by an authorized representative of the issuing company.

1.15 MATERIAL SUBSTITUTIONS

A. Materials proposed for use in the performance of the work that are not specified herein must be submitted to the Owner/Owner’s Representative for evaluation no later than ten days prior to bid.

PART 2 PRODUCTS

2.1 GENERAL

A. The products herein specified are totally pre-engineered products of the listed manufacturer and establish criteria for the approval of substitutions. Products must be part of a virtually odorless, pre-engineered, Low VOC full fleece reinforced, cold fluid applied, liquid resin waterproofing membrane system, equivalent in function, quality, composition and method of application to be considered for approval as an "Approved Substitute". Substitute materials must meet or exceed the physical performance characteristics of the specified materials. PMMA or single component primers or resin systems will not be accepted. A minimum 165 fleece reinforcement is required. Resin membranes or coatings that are un-reinforced or randomly reinforced will not be accepted.

2.2 MANUFACTURERS - MEMBRANE

A. Membrane: Two-component, cold fluid-applied reinforced polyurethane waterproofing membrane with a 360 degree needle punched non-woven 165 polyester reinforcing fleece, for a finished dry film membrane thickness of .070 inch nominal as dictated by the reinforcement. Provide products manufactured and supplied by the following:

1. Kemper System's 2K-PUR adhered waterproofing system.

B. Physical Properties:

Property	**Value**	**Test Method**
Color	Gray-Green	-
Physical state	Cures to solid	-
Nominal thickness (165 fleece)	70 mils	-
Tensile strength @ break	> 1200 psi	ASTM D-412
Elongation	> 62%	ASTM D-412
Tear resistance	>1100 lbf	ASTM D-624
Water vapor transmission	0.45 Perms	ASTM E-96
Water absorption	< 1%	ASTM D-570
Impact resistance	Shore A 68	ASTM D-2240
Usage time*	30 minutes	-
Rainproof after*	6 hours	-
Solid to walk on after*	24 hours	-
Solid to drive on with air rubber tires after*	48 hours	-
Overburden may be applied after	2 days	-
Completely hardened after	3 days	-
Crack spanning	2mm/0.08 inch	-
Resistance to temperatures up to (short term)	250°C/482°F	-
*all times are approximate and depend upon wind, humidity and temperature.		

2.4 ACCESSORIES

A. Polyurethane Primer: Two-component, solvent-free, high solids polyurethane resin for use in improving *adhesion of membrane to wood, metal and bituminous substrate* surfaces. Monitor application rate and adjust depending on substrate absorbency.

B. Epoxy Primer : Two-component, solvent-free epoxy coating for use in improving *adhesion of membrane to cementitious/masonry substrate* surfaces. Monitor application rate and adjust depending on substrate absorbency.

C. Accelerator: Additive specifically designed to accelerate the resin reaction time at ambient temperatures below 50ºF (10ºC). Accelerator to be used with cream resin Component A prior to mixing of multi-component resin. Continuously monitor substrate surface temperatures.

D. Tools, Accessories, and Cleaners: Supplied and/or approved by membrane manufacturer for product installation.

E. Topcoat Surfacing Aggregate: Silica sand, ceramic-coated quartz, or specialty aggregate shall be washed, kiln-dried, and dust-free with the following size specification:

1. Aesthetic: 0.45 - 0.55 mm

F. Leveling and Patching Aggregate: Silica sand shall be washed, kiln-dried, and dust-free, suitable for troweling or pourable self-leveling, round grain or angular with the following size specification:

1. For voids less than ¼" in depth: 0.45 - 0.55 mm
2. For voids ¼" to 2" in depth: 0.7 - 1.2 mm

Mixing Proportions shall be a ratio of resin to sand at 1:2 by volume or as approved by membrane manufacturer.

G. Backer Rod: Expanded, closed-cell polyethylene foam designed for use with cold-applied joint sealant.

H. Caulking: Single component, non-sag elastomeric polyurethane sealant, as recommended or supplied by membrane manufacturer for use in making airtight and watertight seals where required.

I. Miscellaneous Fasteners: Appropriate for purpose intended and approved by fastener manufacturer; length required for thickness of material [with metal washers]; as supplied or approved by membrane manufacturer.

J. Temporary and Night Sealant: As recommended or required by membrane manufacturer.

2.5 AGGREGATE SURFACING

A. Coating: Two-component polyurethane-based resin with graded mineral filler, as provided by the following Manufacturer:

1. Kemper System, Inc.'s Kemcoat TC Premium Coating, Components A, B and C.

B. Sealer: Single component polyurethane-based sealer, as provided by the following Manufacturer:

1. Kemper System, Inc.'s Kemperol H2O Sealer.

C. **Aggregate Finish Coating:** Single component polyurethane-based resin suitable for use to both bond and seal aggregate, as provided by the following Manufacturer**:**

1. Kemper System, Inc.'s Kemcoat Granular.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck/substrate openings, curbs, and protrusions through deck/substrate are in place and solidly set.

C. Verify deck/substrate is structurally supported, secure and sound.

3.2 PREPARATION OF SUBSTRATE

A. General: Surfaces to be prepared as a substrate for the new waterproofing system as follows:

1. The contractor shall determine the condition of the existing structural deck/substrate. All defects in the deck or substrate shall be corrected before new waterproofing work commences. Areas of deteriorated deck/substrate, porous or other affected materials must be removed and replaced with new to match existing.
2. Prepare flashing substrates as required for application of new waterproofing membrane flashings.
3. Inspect substrates, and correct defects before application of new waterproofing. Fill all surface voids greater than 1/8 inch wide with an acceptable fill material.
4. Remove all ponded water, snow, frost and/or ice from the work substrate prior to installing new waterproofing materials.
5. The final substrate for waterproofing shall be clean, dry, free of loose, spalled or weak material including coatings, mineral aggregate, and flood coat/gravel surfacing, oil, grease, contaminants, abrupt changes in level, waterproofing agents, curing compounds, and free of projections which could damage membrane materials.

D. Metal:

1. Clean and prepare metal surfaces to near white metal in accordance with SSPC - SP3 (power tool clean) or as required by membrane manufacturer. Extend preparation a minimum of three (3) inches beyond the termination of the membrane flashing materials. Notch steel surfaces to provide a rust-stop.
2. In addition to cleaning, all metal surfaces shall be abraded to provide a rough open surface. A wire brush finish is not acceptable.

F. Finish Leveling, Patching and Crack Preparation:

1. General: EP primer/sand mix is the preferred material for all substrate finish leveling, crack and wall/deck preparation and patching. EP primer/sand patching mix provides a set time of approximately twelve (12) hours and does not require surface grinding. Kemperol primer/sand mix is typically applied in conjunction with general surface priming.

2. Substrate Leveling & Patching: Substrate conditions are to be evaluated by the Contractor, the Owner, or his designated Representative, and Membrane manufacturer. Perform leveling and patching operations as follows:

a) Level uneven surfaces with a leveling mixture of primer and approved kiln-dried silica sand in a 1:2 primer to sand ratio by volume. Spread and plane this compound with a squeegee and trowel to achieve a flat

surface.

b) Fill cavities with a patching mixture of primer and approved kiln-dried sand in a 1:3/1:3.5 primer to sand ratio by volume.
c) Silica sand must be kept absolutely dry during storage and handling.
d) Any surface to be leveled or filled must first be primed with an appropriate primer.

3.3 PRIMER APPLICATION

A. General:

1. Mix and apply two-component primer in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary materials, as supplied by the membrane manufacturer.
2. The substrate surface must be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth wipe or a combination of methods.
3. Do not install primer on any substrate containing newly applied and/or active asphalt, coal-tar pitch, creosote or penta-based materials unless approved in writing by Membrane Manufacturer. Some substrates may require additional preparation before applying primer.

B. Mixing of Standard EP and D Primers:

1. Premix primer Component A thoroughly with a spiral agitator or stir stick. Pour primer Component B into Component A and mix the components for approximately 2 minutes with a clean spiral agitator on slow speed or stir stick without creating any bubbles or streaks. DO NOT AERATE. The Primer solution should be a uniform color, with no light or dark streaks present.
2. Do not thin primer. Determine required primer coverage for each substrate material/condition and apply in strict accordance with written instructions of Membrane Manufacturer.
3. Mix only that amount of primer components A & B that can be used in 30 minutes.

C. Application of Primer:

1. Apply primer at the rate of approximately 0.7 – 1.4 gallons (2.65-5.30L) per 100 square feet (9 m^2).
2. Roll or brush the primer evenly onto the surface to fully saturate the substrate in one application. Do not allow primer to pond or collect in low areas.
3. Apply primer only up to the edge of the membrane flashing terminations. Primer application past the membrane terminations requires surfacing with an approved material.
4. For EP primer applications over cementitious substrates where protection from substrate wetness is required, apply primer coat at a heavier application rate until pore saturation is achieved.
5. For all EP primer applications, apply kiln-dried sand into the final coat of EP primer while still wet at the rate of 30 lbs. per 100 square feet.
6. Allow standard primers to cure for a minimum of twelve (12) hours before membrane application. Allow urethane-based and epoxy-based quick-dry primers to cure for a minimum of three (3) hours before membrane application. Membrane must be applied to primer only when completely dry and without tack.
7. Exposure of the primer in excess of eight (8) days or premature exposure to

moisture may require removal and application of new primer. DO NOT apply new primer over exposed primer older than eight (8) days, primer prematurely exposed to moisture, or primer used as temporary waterproofing, unless approved in writing by the Membrane Manufacturer.

D. Disposal of Primer:

1. Cured primer may be disposed of in standard landfills. This is accomplished by thoroughly mixing all components.
2. Uncured primer is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation. Do not through uncured resin away.

3.4 MEMBRANE APPLICATION

A. General:

1. Mix and apply cold fluid-applied reinforced polyurethane waterproofing membrane in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary membrane resins and materials, as supplied by the membrane manufacturer.
2. The primed substrate surface shall be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth-wipe or a combination.
3. Protect all areas where membrane has been installed. Do not work off installed membrane during application of remaining work before forty-eight (48) hours of curing. Movement of materials and equipment across installed membrane is not acceptable. If movement is necessary, provide complete protection of affected areas.
4. Closely follow the Membrane Manufacturer's recommendation for hot and cold weather application. Monitor surface and ambient temperatures, including the effects of wind chill.

B. Mixing of Resin:

1. **MIX ONLY FULL UNITS OF RESIN** (breaking down units is not permitted) Note: small units of resin are available for small projects and details. Mix resin Component A (cream formulation) with a spiral agitator until the liquid is a uniform cream color. If the ambient temperature is below 50°F (10°C), then a weather related additive should be combined and mixed into the Component A.

   a) Accelerator should be added to resin Component A when the ambient temperature is 50°F (10°C) and below. The accelerator should be mixed with the spiral agitator for 5 minutes or until both liquids are thoroughly blended.

2. Mix resin Component B (dark brown formulation) with a separate spiral agitator until the color is a uniform dark syrup color.
3. Pour resin entire unit Component A and Component B into a third clean bucket at a 4:1 ratio (by weight) and thoroughly mix the components with a clean spiral agitator. The Resin solution should be a uniform color, with no light or dark streaks present.
4. Mix only that amount of resin components A & B that can be used in 30 minutes.

C. Application of Resin/Fleece

1. Apply mixed resin to the prepared surface at the approximate rate of 4.5 gallons (16.9L) per 100 square feet (9 m^2). The resin should be rolled or brushed liberally and evenly onto the surface using a broad, even stroke. Cover one working area at a time, between 15 – 20 $ft.^2$ (1.4 – 1.9 m^2).
2. Roll out dry polyester fleece onto the liquid resin mix, making sure the SMOOTH SIDE IS FACING UP (natural unrolling procedure), avoiding any folds and wrinkles. The fleece will begin to rapidly saturate with the liquid resin mix. Use a medium nap roller or brush to work the resin into the fleece, saturating from the bottom up, and eliminating air bubbles, wrinkles, etc. The appearance of the saturated fleece should be light opaque amber with no white spots. White spots are indications of unsaturated fleece or lack of adhesion. It is important to correct these faults before the resin cures.
3. Apply additional liquid resin mix on top of fleece at the approximate rate of 2 gallons (7.5L) per 100 square feet (9 m^2) to finish the saturation of the fleece. Roll this final coating into the fleece, which will result in a glossy appearance. The fleece can only hold so much resin and all excess should be rolled forward to the unsaturated fleece, eliminating ponding or excessive build-up of the resin. Any excess resin left on the top of the fleece will weather and peel off. The correct amount of resin will leave no whiteness in fleece and there will be a slightly fibrous surface texture. The final resin coating should be smooth and uniform.
4. Prevent contact between mixed/unmixed resin and new/existing membrane. If any unmixed resin contacts membrane surface remove immediately and clean thoroughly with a cloth rag.
5. At all fleece seams, allow a 2” (5 cm) overlap for all side joints and a 4” (10 cm) overlap for all end joints.
6. At membrane tie-offs, clean in-place membrane with MEK (methyl ethyl ketone) solvent once resin has cured. Allow solvents to fully evaporate before application of new resin.

D. Disposal of Resin:

1. Cured resin may be disposed of in standard landfills. This is accomplished by thoroughly mixing all components.
2. Uncured resin is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation. Do not throw uncured resin away.

3.5 FLASHING APPLICATION

A. Membrane Flashing – General:

1. Membrane flashings shall be fabricated with primer appropriate for the substrate surface, resin of the same base chemical type as the field membrane, and fleece of the same weight as the field membrane unless specified otherwise.
2. Primer, resin, and fleece mixing and application methods as specified for field membranes are also suitable for membrane flashing.
3. Fleece shall overlap 2” (5 cm) minimum for all joints. Fleece shall be cut neatly to fit all flashing conditions without a buildup of multiple fleece layers. Work wet membrane with a brush or roller to eliminate blisters, openings, or lifting at corners, junctions, and transitions.

D. Penetrations:

1. Flash all penetrations using cold fluid-applied reinforced polyurethane waterproofing membrane. Flashing material shall be the same resin used in the field membrane with 165 fleece reinforcement.
2. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. There must be a minimum of a two (2) inch (5 cm) overlap between vertical and horizontal flashing components.

E. Drip Edges:

1. Metal drip edges and shall be installed to solid substrate surfaces only. Securement to gypsum-based panels, cementitious stucco, synthetic stucco, wood or metal siding or coping, and other similar materials is not acceptable.
2. Flash all drip edges by extending the field membrane all the way to the edge of the exposed face prior to installing the metal edging. Strip in the metal flange with a separate 8 inch wide strip of membrane adhered to both the securement flange and to the field membrane.
3. For conditions where water infiltration behind the exposed drip edge or gravel stop face is possible, install a separate 165 polyester fleece bottom layer positioned behind the face area and extending a minimum of four (4) inches past the securement flange onto the field substrate prior to installing the drip edge or gravel stop.

3.6 AGGREGATE SURFACING

A. Mixing of Coating

1. Mix Component A (light brown formulation) and Component B (white formulation) in a separate clean mixing bucket with a spiral Kemperol agitator for 15-20 seconds, until the liquid is a uniform beige color.
2. Gradually add Component C (white graded fillers) to the liquid while mixing continues for an additional 30-40 seconds until a smooth, lump free mix is produced.
3. Mix only that amount of surfacing that can be used in 10 minutes. Do not exceed mixing times.

B. Application of Coating and Aggregate

1. Empty mixing bucket of all Kemcoat TC Premium mix onto the prepared surface and spread with a serrated squeegee at the specified coverage rate, approximately 23 kilograms per 100 square feet (9 m^2).
2. Allow the Kemcoat TC Premium mix to self-level and reach an initial set for 10-20 minutes until material will retain a peak after being touched by a finger.
3. Broadcast aggregate to excess into Kemcoat TC Premium until a uniform dry aggregate layer has been achieved. Aggregate will initially sink into Kemcoat TC Premium, requiring the application of additional aggregate.
4. Allow the aggregate-filled Kemcoat Premium to cure for approximately 2 hours, then remove excess aggregate by brooming and vacuuming.

C. Sealing

1. Apply Kemperol Sealer to Kemcoat TC Premium Coating to provide a sealed, maintainable surface finish.
2. Apply Kemperol Sealer with a roller at the rate of 0.8 gal. per 100 square feet per coat. After completion of mineral aggregate surfacing, avoid any traffic for a minimum of three (3) days.

3.7 TEMPORARY CLOSURES & WATERSTOPS

A. Contractor shall be responsible to ensure that moisture does not damage any completed section of the new waterproofing system. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition. All temporary closures shall be made as recommended or required by the membrane manufacturer.

3.8 PROTECTION

A. Upon completion of waterproofing and flashings (including all associated work), institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. Protect all areas where membrane has been installed.

3.9 CLOSEOUT

A. Correction of Work:

1. Work that does not conform to specified requirements including tolerances, slopes, and finishes shall be corrected and/or replaced. Any deficiencies of membrane application, termination and/or protection as noted during the Membrane Manufacturer's inspections shall be corrected and/or replaced at Contractor's expense.

B. Clean-Up:

1. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to preconstruction condition.

END OF SECTION 07 56 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

2. Removal and installation of new sealant at junction between existing window units and masonry.

3. Exterior joints in glass and metal components at new Lantern.

1.2 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:

1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.5 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Single-Component Nonsag Urethane Sealant:

1. Products:
    a. Sika Corporation, Inc.; Sikaflex - 1a.
    b. Sonneborn, Division of ChemRex Inc.; NP 1.
2. Type and Grade: S (single component) and NS (non-sag).
3. Class: 25.
4. Uses Related to Exposure: T (traffic) and NT (non-traffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

2.3 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.

a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

b. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

F. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior vertical and horizontal control and expansion joints in unit masonry.

1. Joint Sealant: Single-component non-sag urethane sealant.

B. Joint-Sealant Application: Exterior perimeter joints between unit masonry and frames of doors, windows and louvers.

1. Joint Sealant: Single-component non-sag urethane sealant.

END OF SECTION 07 92 00

SECTION 08 03 51 – HISTORIC TREATMENT OF STEEL WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the restoration of the existing steel windows as follows:

1. The preparation/removal of existing paints/coatings and installation of new at interior & exterior.
2. Removal & disposal of non-historic screen.
3. Removal of existing sealant and installation of new.
4. In-place repair of existing steel sills and frames.
5. Reglazing
6. Providing new glazing puddy/compound at exterior glass.
7. Providing new profiled trim to match existing historic trefoil pattern.

1.2 RELATED WORK SECTIONS

A. Section 07 92 00 – Sealants.

B. Section 09 91 13 – Painting.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Restoration Program: For each window type provide a summary of the restoration process, including protection of removed elements and protection of surrounding materials on building and site during work. Describe materials, method and equipment to be used.

C. Qualifications: Documentation showing qualifications of personnel proposed to perform the steel window restoration work, and a list identifying prior installations completed by the Contractor.

D. Samples: For each exposed product and for each color and texture specified.

1.4 QUALITY ASSURANCE

A. The Contractor shall provide qualified workers trained and experienced in repairing and restoring windows in historic buildings and shall submit documentation of 5 consecutive years of work of this type. A list of installations made shall also be provided identifying when, where and for whom the installations were made.

B. Glazing Standard: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated.

C. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Paint and putty removal method.
2. Removal of rust and preparation of steel painting.
3. Steel Window Repair: Prepare one entire window unit to serve as mockup to demonstrate samples of each type of repair of steel window members, including frame, sash, glazing, and hardware.
4. Straightening of bent sections.
5. Installation of glazing.
6. Installation of new sealants at glass to metal and metal to adjoining structure.
7. Sample Installation: Restore one existing window and profiled trim designated by the Architect. Obtain the Architect's approval of the sample installation before progressing with the project. The approved sample installation will be the standard for comparison and approval of work provided under this section.
8. Approval of the mock-up does not constitute approval of deviations from the Contact Documents or the manufacturer's recommendations contained within the mock-ups unless the Architect specifically approves of such deviations in writing.

1.5 STORAGE: Materials shall be stored out of contact with the ground and under weathertight covering.

1.6 JOB CONDITIONS

A. Do not proceed with any portion of the Work outlined until unsatisfactory conditions have been corrected in a manner acceptable to the Door Restorer.

B. Notify Architect about anticipated problems and request direction.

C. Follow local, state, and federal regulations, safety standards, and codes. References indicated elsewhere in this Section. When a conflict exists, the more stringent document governs.

D. Provide weather protection for exterior components temporarily opened up.

PART 2 - PRODUCTS

2.1 WINDOW REPAIR MATERIALS:

A. All materials to be appropriate for exterior use.

B. Steel: Hot-rolled steel matching the size and configuration of existing frame components. Steel shapes shall conform to all Steel Window Institute Guidelines.

C. Patching Compounds: Two-part, metal filled epoxy resin, steel-patching compound; knife grade formulation as recommended in writing by manufacturer for types of repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated due to corrosion. Filler shall be capable of filling deep holes and spreading to featheredge.

1. Source limitations: Obtain steel-patching compound from single source manufacturer.
2. 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. Belzona, Inc.; Belzona International, ltd.

2.2 GLAZING MATERIALS:

A. Glass: Provide new glass to existing steel window frames to match period of the structure's construction.

1. Historic non-wired glass: Based on approval of four (4) samples matching survey of existing historic glass condition, provide Hollander Glass "Hollander Circa 1800™" 3 mm thermally formed, tempered restoration glass or approval equal.

B. Glazing Tape: Preformed Butyl-Polyisobutylene Glazing Tape: Provide manufacturer's standard solvent-free butyl-polyisobutylene formulation tape, complying with AAMA A804.1; non-staining and non-migrating in contact with nonporous surfaces.

C. Adhesion Promoters: As recommended by structural glazing tape manufacturer for specific materials.

D. Glazing Points: Standard stainless-steel spring clips in size appropriate for size of glass pane.

E. Fasteners: Fasteners shall be stainless steel, or non-ferrous metal.

F. Glazing System: Glazing compound for single pane glass shall be oil-based, non-staining and non-bleeding, and shall pass the test requirements of ASTM C 741, and ASTM C 742.

1. Traditional Glazing Products: Glazing clips and oil-based glazing putty or latex glazing compound.

a. DAP Products Inc.
b. Sarco Putty Company, Inc.

2. Modern Glazing Products: Glazing clips and single-compound polyurethane glazing compound ASTM C 920, Type S, Grade NS, Class 25, Use G; struck uniformly to match taper of existing glazing putty (removed)l colored as required to match painted frame.
3. Modern Glazing with Stops: Custom-retrofitted, wedge-shaped galvanized-steel stops (matching taper of existing glazing putty), painted to match painted frame, and mechanically attached at equal intervals maximum 12-inches on center; with mitered corners and butyl glazing tape on both sides of glass.
4. Primers and Cleaners for Glazing: As recommended in writing by glazing material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 STEEL WINDOW REPAIRS

A. Protect adjacent materials from damage by historic treatment of steel windows.

B. Clean Steel windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

3.3 HISTORIC TREATMENT OF STEEL WINDOWS, GENERAL

A. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from the window interior at 10 feet away and from the window exterior at 20 feet away.

B. General: In treating historic items, disturb them as minimally as possible and as follows:

1. Stabilize and repair steel windows to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Remove coatings from accessible surfaces according to Section 09 91 93 “Exterior Painting” unless otherwise noted.

C. Mechanical Abrasion: Do not use abrasive methods such as sanding, wire brushing or power tools, except as indicated as part of the historic treatment program and as approved by Architect.

D. Repair Steel Windows: Match existing materials and features, retaining as much original material as possible to perform repairs.

1. Unless otherwise indicated, repair steel windows by patching, splicing or otherwise reinforcing steel with new or salvaged steel members.
2. Where indicated, repair steel windows by limited replacement matching existing material.

E. Protection of openings: Where frame or windows are removed, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.

3.4 RUST REMOVAL

A. Chemical Rust Removal:

1. Remove loose rust scale with tools and abrasives to sound metal or firmly adhered rust residue. Vacuum debris from cavities.
2. Apply rust remover with brushes or as recommended in writing by manufacturer.
3. Allow rust remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing. Do not allow extended dwell time.

4. Wipe off residue with mineral spirits and either steel wool or soft rags, or clean with method recommended in writing by manufacturer to remove residue.
5. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
6. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

B. Mechanical Rust Removal:

1. Remove rust with tools and abrasives. Vacuum debris from cavities.
2. Wipe off residue with mineral spirits and either steel wool or soft rags.
3. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
4. Prime immediately to prevent rust. Do not touch metal surfaces until primed.

C. In-Shop Rust and Paint Removal: Remove rust and paint in shop by methods indicated in the historic treatment program and as approved by Architect.

1. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
2. Prime immediately to prevent rust. Do not touch cleaned metal surfaces until primed.

3.5 STEEL WINDOW PATCH-TYPE REPAIR

A. General: Patch steel members that exhibit depressions, nonstructural holes, and corrosion.

1. Remove stops, frame, and screens before performing patch-type repairs at meeting surfaces unless otherwise indicated.
2. Verify that surfaces are sufficiently clean and free of paint residue according to steel-patching-compound manufacturer's written instructions prior to patching.

B. Remove rust down to sound, rust-free material.

C. Apply steel-patching compound to fill depressions, nicks, cuts, and other voids created by rusted, removed or missing steel.

1. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
2. Apply patching compound in layers as recommended in writing by manufacturer until the void is completely filled.
3. Finish patch surface smooth and flush with adjacent steel, without voids in patch material, and matching contour of steel member.
4. Clean spilled compound from adjacent materials immediately.

D. Verify that patch repairs do not interfere with snug fit of frame and against each other along entire perimeter of frame in fixed position. If not, modify the patch repair or re-straighten window as required.

3.6 STEEL WINDOW MEMBER-REPLACEMENT REPAIR

A. General: Replace parts of entire steel window members at locations where damage is too extensive to patch.

1. Remove frame and screens from windows before performing member-replacement repairs unless otherwise indicated.
2. Verify that surfaces are sufficiently clean and free of paint residue prior to repair.
3. Cut out structurally weakened sections.
4. Custom fabricate new steel of same size, thickness and shape as cut-out material to replace missing steel; either replace entire steel member or splice new steel part into existing member.
5. Weld or braze replacement material in place and grind the repair smooth and flush with adjoining metal or filled metal as applicable.
6. If replacement metal sections of original cross section cannot be found from salvage sources, weld flat plates into a built-up section.

B. Repair remaining depressions, holes or similar voids with patch-type repairs.

C. Clean spilled material from adjacent surfaces immediately.

D. Glazing: Provide replacement glazing clips coordinated with glazing system indicated.

E. Reinstall units removed for repair into original openings.

F. Verify that member-replacement repairs do not interfere with snug fit of frame and against each other along entire perimeter of frame in fixed position. If not, modify the member-replacement repair or straighten window as required.

3.7 GLAZING

A. Comply with combined written instructions of manufacturers of glass, glazing system, and glazing materials unless more stringent requirements are indicated.

B. Remove cracked and damaged glass and glazing materials from openings and prepare surfaces for reglazing.

C. Remove existing glass and glazing where indicated on Drawings and prepare surfaces for reglazing.

D. Prime steel, including glazing rabbets, with finish-paint primer before installing glass.

E. Size glass as required by Project conditions to provide necessary bite on glass and minimum edge and face clearances with reasonable tolerances.

F. Apply primers to joint surfaces where required for adhesion of glazing system, as determined by preconstruction testing.

G. Install setting bead, side beads and back bead against stop in glazing rabbets before setting glass.

H. Install glass with proper orientation so that coatings, if any, face exterior or interior as required.

I. Install glazing clips and stops as required for glazing system, minimum two clips in each section of the window frame surrounding the new glass.

J. Disposal of Removed Glass: Remove from Owner's property and legally dispose of it unless otherwise indicated.

3.8 PROFILED TRIM

A. Install profiled trim where indicated.

1. Locate trim on outside of window.
2. Install trim by securing with metal twist clips to frame or in a historically accurate manner.

B. Replace existing screen; remove it from Owner's property.

C. Install profiled trim to be smooth, flat and uniformly taut.

3.9 CLEANING AND PROTECTION

A. Protect window surfaces from contact with contaminating substances resulting from construction operations. Monitor window surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains or other contaminants. If contaminating substances contact window surfaces, remove contaminants immediately.

B. Clean exposed surfaces immediately after historic treatment of steel windows. Avoid damage to coatings and finishes. Remove excess sealants, glazing and repair materials, dirt and other substances.

C. Remove and replace glass that has been broken, chipped, cracked, abraded or damaged during construction period.

D. Wash and polish glass on both faces (interior and exterior) not more than four (4) days prior to the date scheduled for inspection to establish date of substantial completion of the project. Comply with glass manufacturer's recommendations for final cleaning.

E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 08 03 51

SECTION 08 11 16 – ALUMINUM DOORS & FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the restoration of the existing metal door, frame and hardware:

1. Aluminum clad door leaf & frame.
2. Door hardware.

1.2 RELATED WORK SECTIONS

A. Section 07 92 00 – Sealants.

B. Section 09 91 13 – Painting.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Restoration Program: For each component provide a summary of the restoration process, including protection of removed elements and protection of surrounding materials on building and site during work. Describe materials, method and equipment to be used.

C. Qualifications: Documentation showing qualifications of personnel proposed to perform the metal door, frame and hardware restoration work, and a list identifying prior installations completed by the Contractor.

D. Samples: For each exposed product and for each color and texture specified.

1.4 QUALITY ASSURANCE

A. The Contractor shall provide qualified workers trained and experienced in repairing and restoring doors in historic buildings and shall submit documentation of 5 consecutive years of work of this type. A list of installations made shall also be provided identifying when, where and for whom the installations were made.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Paint and putty removal method.
2. Removal of rust and preparation of metal painting.
3. Metal Door Repair.
4. Approval of the mock-up does not constitute approval of deviations from the Contact Documents or the manufacturer's recommendations contained within the mock-ups unless the Architect specifically approves of such deviations in writing.

1.5 STORAGE: Materials shall be stored out of contact with the ground and under weathertight covering.

1.6 JOB CONDITIONS

A. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas.

B. Follow local, state, and federal regulations, safety standards, and codes. References indicated elsewhere in this Section. When a conflict exists, the more stringent document governs.

C. Provide weather protection for exterior components temporarily opened up.

PART 2 - PRODUCTS

2.1 DOOR REPAIR MATERIALS:

A. All materials to be appropriate for exterior use.

B. Aluminum: Extruded aluminum matching the size and configuration of existing frame components. Aluminum shapes shall conform to all Aluminum Association Guidelines.

C. Patching Compounds: Two-part, metal filled epoxy resin, aluminum-patching compound; knife grade formulation as recommended in writing by manufacturer for types of repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated due to corrosion. Filler shall be capable of filling deep holes and spreading to featheredge.

1. Source limitations: Obtain aluminum-patching compound from single source manufacturer.
2. 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. Belzona, Inc.; Belzona International, ltd.

2.2 FRAMING SYSTEM

1. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced to support imposed loads.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fastener's and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from stainless steel and finished to match framing system.

D. Concrete and Masonry Inserts: Fabricate from stainless steel.

2.3 DOOR HARDWARE SCHEDULE

A. General: Reinstall existing hardware sets as required to affect a complete and functional installation.

B. Hardware Set:

Qty.	**Item**	**Description**	**Manufacturer**	**Finish**
2	Hinge	Iron strap hinge & pintle	N/A	Matte black.
2	Lock	Progressive double lock	The Fox Police Lock Company	Matte black
1	Lock	Top flush bolt	N/A	Matte black

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

B. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 METAL DOOR REPAIRS

A. Protect adjacent materials from damage by historic treatment of metal door.

B. Clean metal door of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

3.3 HISTORIC TREATMENT OF METAL DOOR, GENERAL

A. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from the door interior at 5 feet away and from the door exterior at 10 feet away.

B. General: In treating historic items, disturb them as minimally as possible and as follows:

1. Stabilize and repair metal door to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Remove coatings from accessible surfaces according to Section 09 91 93 “Exterior Painting” unless otherwise noted.

C. Mechanical Abrasion: Do not use abrasive methods such as sanding, wire brushing or power tools, except as indicated as part of the historic treatment program and as approved by Architect.

D. Repair Metal Doors: Match existing materials and features, retaining as much original material as possible to perform repairs.

1. Unless otherwise indicated, repair metal door by patching, splicing or otherwise reinforcing metal with new or salvaged metal members.
2. Where indicated, repair metal door by limited replacement matching existing material.

E. Repair and Refinish Existing Hardware: Dismantle door hardware, strip paint, repair and refinish it to match finish samples; and lubricate moving parts just enough to function smoothly.

F. Protection of openings: Where frame or door is removed, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.

3.4 RUST REMOVAL

A. Chemical Rust Removal:

1. Remove loose rust scale with tools and abrasives to sound metal or firmly adhered rust residue. Vacuum debris from cavities.
2. Apply rust remover with brushes or as recommended in writing by manufacturer.
3. Allow rust remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing. Do not allow extended dwell time.
4. Wipe off residue with mineral spirits and either steel wool or soft rags, or clean with method recommended in writing by manufacturer to remove residue.
5. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
6. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

B. Mechanical Rust Removal:

1. Remove rust with tools and abrasives. Vacuum debris from cavities.
2. Wipe off residue with mineral spirits and either steel wool or soft rags.
3. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
4. Prime immediately to prevent rust. Do not touch metal surfaces until primed.

C. In-Shop Rust and Paint Removal: Remove rust and paint in shop by methods indicated in the historic treatment program and as approved by Architect.

1. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
2. Prime immediately to prevent rust. Do not touch cleaned metal surfaces until primed.

3.5 METAL DOOR PATCH-TYPE REPAIR

A. General: Patch metal members that exhibit depressions, nonstructural holes, and corrosion.

1. Remove stops, frame, and screens before performing patch-type repairs at meeting surfaces unless otherwise indicated.
2. Verify that surfaces are sufficiently clean and free of paint residue according to metal-patching-compound manufacturer's written instructions prior to patching.

B. Remove rust down to sound, rust-free material.

C. Apply metal-patching compound to fill depressions, nicks, cuts, and other voids created by rusted, removed or missing metal.
   1. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
   2. Apply patching compound in layers as recommended in writing by manufacturer until the void is completely filled.
   3. Finish patch surface smooth and flush with adjacent metal, without voids in patch material, and matching contour of metal member.
   4. Clean spilled compound from adjacent materials immediately.

D. Verify that patch repairs do not interfere with snug fit of frame and against each other along entire perimeter of frame in fixed position. If not, modify the patch repair or re-straighten door as required.

3.6 METAL DOOR MEMBER-REPLACEMENT REPAIR

A. General: Replace parts of entire metal door members at locations where damage is too extensive to patch.
   1. Remove frame and screens from door before performing member-replacement repairs unless otherwise indicated.
   2. Verify that surfaces are sufficiently clean and free of paint residue prior to repair.
   3. Cut out structurally weakened sections.
   4. Custom fabricate new metal of same size, thickness and shape as cut-out material to replace missing metal; either replace entire metal member or splice new metal part into existing member.
   5. Weld or braze replacement material in place and grind the repair smooth and flush with adjoining metal or filled metal as applicable.
   6. If replacement metal sections of original cross section cannot be found from salvage sources, weld flat plates into a built-up section.

B. Repair remaining depressions, holes or similar voids with patch-type repairs.

C. Clean spilled material from adjacent surfaces immediately.

D. Glazing: Provide replacement glazing clips coordinated with glazing system indicated.

E. Reinstall units removed for repair into original openings.

F. Verify that member-replacement repairs do not interfere with snug fit of frame and against each other along entire perimeter of frame in fixed position. If not, modify the member-replacement repair or straighten door as required.

3.7 CLEANING AND PROTECTION

A. Protect DOOR surfaces from contact with contaminating substances resulting from construction operations. Monitor door surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains or other contaminants. If contaminating substances contact door surfaces, remove contaminants immediately.

B. Clean exposed surfaces immediately after historic treatment of metal doors. Avoid damage to coatings and finishes. Remove excess sealants and repair materials, dirt and other substances.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

1. Final Cleaning – thoroughly clean all meal work and finish with mild soap and water or cleaning solution recommended by manufacturer. Do not use abrasive cleaners which would scratch or damage the finish surface.

END OF SECTION 08 11 16

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. New Lantern glass walls and roof panels.
2. New Glass door at Lantern.

B. Related Requirements:

1. Section 088120 – Bolted Structural Glazing

1.2 DEFINITIONS

A. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

B. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.3 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 thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, 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.

1.4 REFERENCES

A. ASTM C1036 Standard Specification for Flat Glass.

B. ASTM C1048 Standard Specification for Heat-Treated Flat Glass.

C. ASTM C1172 Standard Specification for Laminated Architectural Flat Glass.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: 12-inch- square, for each type of glass product indicated.

1. Tinted matt black glass.
2. Laminated glass.

C. Glazing Schedule: Use same designations indicated on Drawings.

D. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer.

1.6 QUALITY ASSURANCE

A. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing according to ASTM C 1087, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

B. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.

C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
2. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Sloped Glazing Guidelines."

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass

units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Bendheim Glass – 82 Totowa Road, Wayne, NJ
Tel. 800-221-7379 Web: www.bendheimarchitectural.com

B. National Glass Products – 814 Ponce De Leon Boulevard, Coral Gables, FL 33134
Tel. 646-406-2097 Web: www.ngdglass.com

C. Agnora Architectural Glass – 200 Mountain Road, Collingwood, Ontario Canada
Tel. 705-444-6654 Web: www.agnora.com

D. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

1. Obtain tinted glass from single source from single manufacturer.
2. Obtain coated glass from single source from single manufacturer.

E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer as outlined in Section 088120 Bolted Structural Glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Wind Pressures: Determine design wind pressures applicable to Project in accordance with ASCE/SEI 7, based on heights above grade indicated on Drawings.

a. Wind Design Data: As indicated on Drawings.
b. Basic Wind Speed: **98mph**.
c. Importance Factor: **1.0**.
d. Exposure Category: **C**.

3. Probability of Breakage for Sloped Glazing: For glass sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
5. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

2.3 GLASS PRODUCTS

A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.

1. Ultra-Clear (Low-Iron) Float Glass: Class I (clear); with a minimum 91 percent visible light transmission and a minimum solar heat gain coefficient of 0.87.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

C. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.4 LAMINATED GLASS

A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation. Interlayer approved by SGCC.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Kuraray America, Inc.; products scheduled or comparable product by one of the following:

a. Eastman Chemical Company.

b. SentryGlas.

2. Construction: Laminate glass with polyvinyl butyral interlayer (PVB) to comply with interlayer manufacturer's written instructions.
3. Interlayer Thickness: .060.
4. Interlayer Color: Clear unless otherwise indicated.

2.5 GLAZING GASKETS

A. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene.
2. Silicone.

2.6 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. 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:

1. Sika Corporation.
2. The Dow Chemical Company.
3. Tremco Incorporated.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; non-staining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit 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 publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 GLAZING

A. General: 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.

1. Glazing channel dimensions, as indicated on 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.

2. 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.
3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
4. 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.
5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
6. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
7. 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.

B. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

1. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
2. 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.
3. Apply heel bead of elastomeric sealant.
4. 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 & work toward centers of openings.
5. Apply cap bead of elastomeric sealant over exposed edge of tape.

C. Sealant Glazing (Wet): 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.

1. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
2. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.2 CLEANING AND PROTECTION

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. 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 substances immediately as recommended by glass manufacturer.

B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

3.3 LAMINATED GLASS SCHEDULE

A. Glass Type **GL-1**: Clear laminated glass with two plies of **ultraclear fully tempered** float glass and ultraclear PVB interlayer.

1. Basis-of-Design Product: Kuraray America, Inc.; Trosifol UltraClear**.**
2. Minimum Thickness of Each Glass Ply: ¼” + 3/8”.
3. PVB Interlayer Thickness: **0.060 inch (1.52 mm)**.

B. Glass Type **GL-2**: Matte Black laminated glass with two plies of **matte fully tempered** float glass and ultraclear PVB interlayer.

1. Basis-of-Design Product: Kuraray America, Inc.; Trosifol UltraClear**.**
2. Minimum Thickness of Each Glass Ply: ¼” + 3/8”.
3. PVB Interlayer Thickness: **0.060 inch (1.52 mm)**.

END OF SECTION 08 80 00

SECTION 088120 – BOLTED STRUCTURAL GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the system of non-insulated, bolted structural glass panels supported by a steel tube frame.

B. Work under this Section is the responsibility of the Specialty Glazed Structure Contractor and consists of furnishing all things necessary for and, incidental to, the execution and completion of the point supported structural glass system, steel tube support frame, stainless steel connections and parts, and accessory work. Also, fabrication, packaging and delivery to job site, and installation by an installer approved in writing by the Specialty Glazed Structure Contractor and Owners Representative.

C. The complete System shall be a single source from the Specialty Contractor.

D. Related Requirements:
1. Section 051200 - Structural Steel
2. Section 088000 - Glazing.
3. Section 099113 – Exterior Painting

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide structural 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 thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, 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.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)
1. AAMA/WDMA/CSA 101/I.S.2/A440 (2011) Standard/Specification for Windows, Doors, and Skylights.

B. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1. ANSI Z97.1 (2009; Errata 2010) Safety Glazing Materials Used in Buildings -Safety Performance Specifications and Methods of Test.

C. AMERICAN WELDING SOCIETY (AWS)
1. AWS D1.1/D1.1M (2015; Errata 1 2015; Errata 2 2016) Structural Welding Code – Steel

D. ASTM INTERNATIONAL (ASTM)
1. ASTM C 1248 (2008) Standard Test Method for Staining of Porous Substrate by Joint Sealants
2. ASTM C1036 (2010; E 2012) Standard Specification for Flat Glass
3. ASTM C1048 (2012; E 2012) Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
4. ASTM C1172 (2014) Standard Specification for Laminated Architectural Flat Glass
5. ASTM C162 (2010) Standard Terminology of Glass and Glass Products
6. ASTM C639 (2001; R 2011) Rheological (Flow) Properties of Elastomeric Sealants

1.4 SUBMITTALS

A. Preconstruction Submittals
1. Qualifications
a. List of at least five (5) completed projects using similar systems or equal. All submitted projects must demonstrate the inclusion under one contract, of supply and installation of point supported glazing and steel support system. For each project, submit photographs showing detail of installations.
b. Proof of five (5) years of relevant experience and the financial ability to perform is a minimum requirement.
c. Professional Engineer specializing in bolted structural glass structures and licensed in the State of New York.

B. Shop Drawings
1. Elevations, sections, connection details, and glazing layup.
2. Panel thickness shall be sized by the Structural Glass Contractor.
3. Submit complete shop drawings including glass panel and support steel layouts and details. Show dimensioned layout of structural glazing in relation to adjacent work.
4. Include details of all supports and data to show provisions for vertical and horizontal expansion/contraction and building movements as necessary. Indicate expected movement from weather and seismic.
5. Identify all materials, attachments, devices and accessories including necessary tolerances.
6. After approval of shop drawings, provide a detailed set of field installation drawings and a written installation procedure. Identify each part by size and number.

C. Design Data:
1. Preliminary engineering confirming proposed sizes of glass and structural members and all loading reactions to the perimeter structure adjacent to glazed structure.
2. Prior to fabrication of the structural glazing, submit design calculations prepared in accordance with current design rules for structural glazing and applicable codes. Include analysis and design for all combinations of loads such as live, dead, wind, thermal, snow, seismic, etc.
3. Supply structural reactions in each axis, at each typical support, for review by the Project Engineer, and the maximum glass deflections in all axes.

4. Supply calculations for support and other details as necessary.

D. Product Data: For each glass product and glazing material indicated.

E. Samples:
1. 12-inch- square, for each type of glass product indicated, other than monolithic clear float glass.
2. Samples of all fixing hardware assemblies, spiders, bolts and accessories.

F. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer.

1.5 QUALITY ASSURANCE

A. Specialty Glazed Structure Contractor Qualifications
1. The Specialty Glazed Structure Contractor shall provide in-house services which include full design, engineering and installation service for the structural glazing, steel tube framing and fittings as a single entity. Subcontracting with outside sources for any of these services is not acceptable. The assembly of joint ventures to provide these services is also not acceptable.
2. Project shall be contracted for and managed directly by the Specialty Glazed Structure Contractor. Tenders or project management by a sales agent, intermediary, glazing contractor, agent or distributor of the listed Specialty Glazed Structure Contractor will not be acceptable.

B. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing according to ASTM C 1087, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

C. Provide materials that are certified by an independent testing laboratory to meet ANSI Z97.1 and CPSC 16 CFR 1201 Category II.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
2. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Sloped Glazing Guidelines."

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. All glass, steel, hardware, and fittings shall be manufactured, crated, stored, handled and shipped in a manner that will provide unscratched and undamaged units delivered to the site. Fittings which engage with the glass shall be individually boxed in a way to protect edges from

damage and/or scratching. Deliver products to the site in unopened containers, labeled plainly with manufacturers' name and brands. Deliver window assemblies in an undamaged condition. Exercise care in handling and hoisting windows during transportation and at the job site. Store components out of contact with the ground, under a weathertight covering.

B. Finished surfaces shall be protected during shipping and handling using the manufacturer's standard method, except that no coatings or lacquers shall be applied to surfaces to which sealants, caulking, or glazing compounds must adhere.

C. Time the delivery of materials to the site to ensure uninterrupted progress of the installation work.

1.7 WARRANTY

A. Provide a five (5) year warranty on the design, engineering and installation workmanship. The start date of the warranty shall be thirty (30) days after completion of the scope of work.

B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 5 years from date of Completion.

C. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 5 years from date of Completion.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

A. Design the structural glazing and steel support system and applicable other components for the locations and conditions shown in the architectural and structural drawings and to the loading requirements and codes specified in the bid documents.

B. Temperature variation: 0 deg F to +185 degrees F.

C. Include loads created by installation techniques and lifting devices.

D. The Structural Glazing engineer shall accommodate the following in the system's design:
1. Deflections of edge beams due to loading applied after the installation of the cladding.
2. Side-sway movements of the adjacent structure due to wind and seismic load.
3. Anticipated deflections due to self-weight of the structural glass system.

2.2 FABRICATION

A. Provide all glass, steel, structural hardware, connectors, fasteners and accessories required for a complete installation of the structural glazing as indicated in approved shop drawings.

B. Code each part for easy identification. Cross reference this coding to shop/installation drawings and to shipping lists.

2.3 SYSTEM DESCRIPTION

A. The system is comprised of glass panels with drilled holes such that the glass can be mechanically attached using stainless steel fasteners attached to the support structure of spiders, channels, and steel tube support frames.

B. Glass joints are comprised of uninterrupted wet silicone with an extruded silicone profile inner compression seal. Support for the system shall be by means of a steel frame with geometry as indicated on the drawings. All of these elements shall be provided by the Specialty Glazed Structure Contractor as a single source.

C. Wind pressure acting inward against the glass shall engage the vertical steel tubes. The resulting space frame of shall act in concert to perform within the specified performance requirements.

D. The steel tube frame shall carry all loads associated with the support of the glass system and related hardware and enclosure elements. Deflection of the frame under full loading shall be minimized and addressed in the calculated design and fabrication drawings and shall not exceed limits that could cause any element to fail.

2.4 METALS FOR GLAZING ATTACHMENT

A. To prevent bending stresses at the glass holes, the glass attachment bolts shall be grade A316 stainless steel and able to rotate up to 10 degrees in any direction or to an angle as required by the application. The stainless steel shall be separated from the glass with durable and UV resistant rings. The glass hole-ring shall be anodized aluminum and the other rings shall be silicone, nylon or as required. Where rotational fittings are not used, calculations shall be provided that show the glass fixing bolt does not locally impact the glass stresses, and that the connection is able to flex sufficiently in the glass deformed shape without depending on rubber, plastic bushing or similar materials. Bolt diameters shall be per structural requirements. Calculations shall back-up tests as evidence of compliance.

B. Glazing spiders for the glass bolts shall have provisions for glass thermal movements and resist all design forces. Materials shall be mold formed stainless steel, in a finish to prevent corrosion from sliding surfaces.

C. The tube support structure, to hold the glazing spiders, shall be of sufficient tolerance to accept the glazing system directly. The required tolerance to be per AISC "Code of Standard Practice" for AESS (or better) and shall be indicated in the submittal drawings as required. The connection between glazing spiders and tube support structure shall be designed as mechanical whenever possible and designed to prevent loosening in service.

2.5 GLASS

A. Shall meet the requirements of Section 08 80 00 - GLAZING as amended herein. Sizing and engineering of all units as indicated shall be the responsibility of the Specialty Glazed Structure Contractor.

B. All glass shall be tempered and laminated. All glass to be heat soak tested to check for nickel sulfide inclusions. Overall thickness and lay up design of the glass panels is to be determined by the Glazed Structure Contractor in accordance with specifications and drawings. Laminated glass is to be produced using a laid-in-place SGP interlayer bonded via an autoclave heat and pressure process. Minimum interlayer thickness is to be 0.060". Poured or cast resin laminates will not be permitted. Clear or colored interlayer shall be used as indicated on the drawings.

C. All glass must be horizontally tempered, eliminating tong marks. All edges will be ground flat with a frosted appearance unless otherwise noted. All edgework, holes and notches in the tempered glass panels will be completed before tempering and will comply with the requirements stated below:
   1. ASTM C1036 Standard Specification for Flat Glass.
   2. ASTM C1048 Standard Specification for Heat-Treated Flat Glass.
   3. ASTM C1172 Standard Specification for Laminated Architectural Flat Glass.

D. The specialty glazed structure subcontractor shall demonstrate that the stresses induced in the glass by the fittings are compatible with the strength of the glass and the needs of the performance section of this specification, especially at the holes. Provide finite element calculations to show compliance. Pre-stressing of the glass around holes, to a level which is compatible with the design and use of the fittings, is not permissible.

E. Glass Tolerances: Squareness of panels governs other tolerances and shall be within 3.0 mm of specified dimensions. Edge lengths shall be within 1.5 mm of specified dimensions. Holes shall be within 1.0 mm of specified locations.

F. Glass Holes: Drilled holes shall be straight through. Fitting type shall be as shown in the architectural drawings. All edges of holes shall be cleaned and free of loose or ground materials.

2.6 ARCHITECTURALLY EXPOSED STEEL STRUCTURE (AESS)

A. Shall meet the requirements of Section 05 12 00 - STRUCTURAL STEEL as amended herein. Sizing and engineering of all members as indicated shall be the responsibility of the Specialty Glazed Structure Contractor.

B. Plates, tubes, and profiles shall typically be A36, A500 Gr. B or as required by the approved calculations and as indicated on the approved drawings.

C. High-Strength bolts, nuts and washers: Provide standard carbon steel mechanically galvanized or inorganic coated finish, as necessary, to avoid nickel sulfide failures and provide corrosion protection.

D. Other bolts and nuts: Bolts that are not high-strength or stainless and are subject to corrosive environment, shall be hot dip galvanized or mechanically galvanized or electroplated. In no circumstances shall bolts without any finish be used, unless noted in the approved drawings.

E. Coating specification: Surface preparation: All surfaces must be cured, clean, sound and free of all mill scale, rust, oil, dirt, grease and any other contamination, including salt deposits, which would interfere with new coating adhesion. Surface may not be wet. Bare surfaces must be properly prepared prior to coating application.
   1. Ferrous metal surfaces:
      a. Power or hand washing is required to remove contamination.
      b. Use of a cleaner/degreaser is required to remove any oil or grease.
      c. All cleaning residue must be completely rinsed from surface and surface allowed to dry.
      d. Abrasive blast new steel to SSPC-SP-10 Near-White Blast Cleaning to achieve a 1.5 to 2.0 mil profile.
      e. Blast surface to be primed before flash rusting occurs.
   2. Paint: See Section 09 91 13 – EXTERIOR PAINTING.

2.7 STRUCTURAL SILICONE SEALANT

A. All glass shall be sealed with silicone building sealant. Backer material in joint shall be provided by an extruded silicone profile material.
   1. Type: One-component, neutral-cure, RTV (room temperature vulcanizing) silicone rubber sealant for structural glazing. Sealant material shall meet or exceed the following standards:
      a. ASTM C920, Type S, Grade NS, Class 50, Use NT, G, A and O.
      b. ASTM C1184, Type S, Use G, A, and O.
      c. CID A-A-272 - Sealing Compound: silicone rubber base (for caulking, sealing, and glazing in buildings and other structures).
      d. GSA CID A-A-1556-Sealing Compound Elastomeric Type, single component (for caulking, sealing, and glazing in buildings and other structures).
   2. Shelf Life: 12 months.
   3. Tack-free time: 3 hours.
   4. Working time: 20 to 30 minutes.
   5. Curing time: 7 to 14 days.
   6. Full adhesion time: 14 to 21 days.
   7. Flow, sag, or slump: 2.5mm tested in accordance with ASTM C639.
   8. Volatile organic compound (VOC) content: 28grams/liter.
   9. Cured Sealant Properties after 21 days at 50% relative humidity:
      a. Joint movement capability: Plus and minus 50%, tested in accordance with ASTM C719.
      b. Hardness: 35-durometer hardness, Shore A, tested in accordance with ASTM D 2240.
      c. Maximum Peel Strength: 5.7kg/cm testing in accordance with ASTM C794-10.
      d. Staining: None on concrete, marble, granite, limestone, and brick, when tested in accordance with ASTM C 1248.
      e. Service Temperature Range: Minus 40 to Plus 300 degrees F.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Scope of this section includes the installation of structural glass, point support glass fixings, steel tube frame and other items being supplied in the scope. The Erector shall check all metal

components upon delivery for dents, gouges or other imperfections which may result in rejection of the appearance or reduce strength.

B. The Erector shall check the glass panels upon delivery for scratches, imperfections and edge damage. Damaged glass shall not be installed.

3.2 PREPARATION

A. Provide connections for temporary shoring, bracing and supports as noted on the installation drawings. Handle, lift and align pieces using padded slings, suction cups and/or other protection required to maintain the appearance of the system throughout the installation process.

B. Only lift at connections as approved by the system's Design Engineer.

3.3 INSTALLATION

A. Erect structural glazing, steel tube frame and other items being supplied in the scope in strict accordance with the approved shop/installation drawings and installation procedures.
   1. Glass shall not be positioned by the use of force. Provide temporary bracing and support as required to ensure stability during installation process.
   2. Bolt Head Orientation: All exposed bolt heads shall be oriented as indicated on the approved drawings. Where bolt head alignment is specified, the orientation shall be noted for each connection on the installation drawings. Where not noted, the bolt heads in a given connection shall be oriented to one side.
   3. Field Welding: If required at concealed metal assemblies, weld profile, quality and finish shall be consistent with the quality of any shop welds. If not visible, then welds shall comply with visual appearance specified in AWS D1.1/D1.1M. Weld size and type shall be per the approved shop drawings. Glass and other heat sensitive material must be protected from heat and splatter.
   4. All bolts shall be fully tightened in accordance with methods indicated in the installation drawings. Specified pre-stressed bolts and cable tightening shall be tightened using the necessary tools and the torques checked. Reset calibrations often to ensure torque is accurate.
   5. Clean glazing connectors receiving glazing materials of deleterious substances that might impair the work. Remove protective coatings that might fail in adhesion or interfere with bond of sealants. Comply with the manufacturer's instructions for final wiping of surfaces immediately before the application of primer and glazing sealants. Wipe metal surfaces with an appropriate cleaning agent.
   6. Sealants: Prime surfaces that are to receive glazing sealants in accordance with the manufacturer's recommendations, using recommended primers.
   7. Locate setting blocks, if required by the drawings, at the quarter points of the sill, but no closer than 6 inches to corners of the glass. Use blocks of proper sizes to support the glass in accordance with the manufacturer's recommendations.
   8. Ensure neoprene spacers separate the glass from attachment plates.
   9. Set the glass in a manner that produces the greatest possible degree of uniformity in appearance. Face all glass, which has a dissimilar face, with matching faces in the same direction. Carefully remove all stickers and clean affected area.
   10. Use masking tape or other suitable protection to limit the coverage of glazing materials on the surfaces intended for sealants.
   11. Tool the exposed surface of glazing materials.
   12. Clean excess sealant from the glass and support members immediately after the application, using solvents or cleaners recommended by the manufacturers. Protect

edges of laminated glass from solvents and cleaners that could deteriorate interlayer or bond.

3.4 FIELD QUALITY CONTROL AND CLEANING

A. Structural Requirements: The Owner will engage an independent testing and inspecting agency to perform field inspections, testing and prepare test reports.

B. Product Acceptance: The structural glazing, cable trusses, steel tube frame and other items being supplied in the scope shall be installed clean by the Structural Glass Contractor and then protected by the General Contractor and any other following trades at their expense.

3.5 TOUCH-UP AND FINAL CLEANING

A. Touch-up Painting: Cleaning and touch-up painting of any field welds and abraded areas of shop paint or stainless parts shall be completed to blend with the adjacent surfaces of the product. Such touch-up work shall be done in accordance with manufacturer's instructions.

END OF SECTION 08 81 20

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Exterior Wood Window Frames and Sills.
2. Cast Iron Light Stanchion.
3. Exterior Metal Door.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each finish and for each color and texture required.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.

C. Label each Sample for location and application area.

1.3 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
2. Final approval of color selections will be based on benchmark samples.
    a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.4 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 5 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from manufacturer's full range.

2.2 WOOD WINDOW PAINTS

A. Windows: Provide smooth, filled, and suitably prepared substrate for on-site priming and finishing. Finish exposed exterior wood surfaces of windows:

1. Wood Primer: One (1) Coat.
   a. Product: Tnemec Company, Inc.; 151 Elasto-Grip at 1-2 mils.
2. Wood Finish Paint: Two (2) Coats.
   a. Product: Tnemec Company, Inc.; 1029 Endurotone at 2-3mils per coat.
   b. Color A: To Match Original.

2.3 EXTERIOR METAL PAINTS

A. Shop Applied Painting: Provide smooth, filled, and suitably prepared substrate for on-site priming and finishing. Finish exposed exterior and concealed wood surfaces of windows

1. Primer: One (1) Coat.
   a. Product: Tnemec Company, Inc.; 90-97 Zinc rich primer.

2. Intermediate: One (1) Coat.
    a. Product: Tnemec Company, Inc.; N69 Epoxoline at 4.0 mils.
3. Finish Paint: One (1) Coat.
    a. Product: Tnemec Company, Inc.; 73U ENDURA-SHIELD at 3-5 mils.
    b. Color: To Match Original.

B. Field Applied Painting: Provide smooth, filled, and suitably prepared substrate for on-site priming and finishing. Finish exposed exterior and concealed wood surfaces of windows

1. Primer: Modified Polyamidoamine Epoxy. One (1) Coat.
    a. Product: Tnemec Company, Inc.; 135 CHEMBUILD at 4.0 – 6.0 mils.
2. Intermediate: One (1) Coat.
    a. Product: Tnemec Company, Inc.; N69 Epoxoline at 4.0 – 6.0 mils.
3. Finish Paint: Aliphatic Acrylic Polyurethane. One (1) Coats.
    a. Product: Tnemec Company, Inc.; 73U ENDURA-SHIELD at 3-5 mils.
    b. Color: To Match Original.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND PAINT REMOVAL METHODS

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

C. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 09 91 13

SECTION 101426 - POST AND PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Non-illuminated exterior post and panel sign.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide post and panel sign capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Wind Loads: Determine loads based on the following minimum design wind pressures:

a. Uniform pressure of 200 lbf/sq. ft., acting in any direction.

B. Thermal Movements: Provide post and panel signs that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.3 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for post and panel signage.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Provide message list, typestyles, graphic elements, and layout for each sign at least half size and full-size details of graphics.

a. Include full-size templates for cutout characters and graphic symbols.

3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:
   1. High Pressure Laminate
   2. Include a representative sample of surface-applied graphic symbol required in each panel. Show graphic style, colors, finishes, typestyles, and graphic symbol.
   3. Accessories: Manufacturer's full-size unit.

D. Qualification Data: For fabricator.

E. Maintenance Data: For signs to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC A117.1.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when weather conditions permit installation of signs to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Indicate measurements on Shop Drawings.

1.7 COORDINATION

A. Coordinate installation of anchorages for post and panel/pylon signage. Furnish setting drawings, templates, and directions for installing anchorages and other items that are to be embedded in concrete.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of post and panel signs that fail in materials or workmanship within specified warranty period.

   1. Failures include, but are not limited to, the following:

      a. Deterioration of laminated finishes beyond normal weathering.
      b. Deterioration of embedded graphic image colors and sign lamination.

   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 POST AND PANEL SIGNS

A. 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:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Allen Industries Architectural Signage.
2. KVO Indistries.
3. Best Sign Systems Inc.

2.2 PANEL SIGNS

A. Sign Message Panels: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner.

1. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.
2. Increase metal thickness or reinforce with concealed stiffeners or backing materials as needed to produce surfaces without distortion, buckles, warp, or other surface deformations.
3. Continuously weld joints and seams unless other methods are indicated; grind, fill, and dress welds to produce smooth, flush, exposed surfaces with welds invisible after final finishing.

B. Message Panel Materials:

C. Laminated Panel Signs: Solid phenolic panel core with graphic image covered with thermosetting resin face layer.

1. Surface Finish: Mat UV resistant, outdoor.
2. Edge Condition: Beveled.
3. Corner Condition: Square.
4. Thickness: 3/4 inch (18 mm)].

2.3 POSTS

A. General: Fabricate posts to lengths required for mounting method indicated.

1. Reverse Sleeve Method: Provide inserts recommended by manufacturer, sized for close fit inside posts. Size inserts for direct embedment in concrete foundations and to attach sign posts securely and prevent sign from overturning when subjected to normal loading conditions prevailing at Project site, but not less than 1/3 of post height plus 36 inches (910 mm) for embedment. Drill posts and inserts for through bolts for fastening them together.

a. Provide bolts for fastening posts to inserts.

B. Steel Posts: Fabricate from 0.120-inch- (3.05-mm-) thick, square steel tubing. Include post caps, fillers, spacers, junction boxes, access panels, and related accessories required for complete installation. Hot-dip galvanize post assemblies after fabrication to comply with ASTM A 123/A 123M.

1. Post Size: 2 inches (50 mm0 square.
2. Post Finish: Baked enamel matching sign panel face .
3. Color: As selected by Architect from manufacturer's full range.

2.4 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.5 FABRICATION

A. General: Provide manufacturer's standard post and panel signs of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.6 FINISHES, GENERAL

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Verify that items, including anchor inserts are sized and located to accommodate signs.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Excavation: Excavate for sign foundation to elevations and dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, frost, rain, accumulated water, or construction activities by excavating a further 12 inches (300 mm) , backfilling with satisfactory soil, and compacting to original subgrade elevation.

1. Excavate hole depths approximately [39 inches (990 mm)] below finished grade.

B. Set anchor bolts and other embedded items required for installation of signs. Use templates furnished by suppliers of items to be attached.

1. Protect portion of posts above ground from concrete splatter.

C. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101426

SECTION 10 81 13 – BIRD CONTROL DEVICES

PART 1 - GENERAL`

1.1 SUMMARY

A. This Section includes the following:

1. PermaMesh™ wire mesh bird exclusion system.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 05 12 00 – Structural Steel.

C. Section 05 50 00 – Metal Fabrications.

1.3 SUBMITTALS

A. Samples: Prior to installation the contractor shall submit samples of all materials to be installed for each type and finish of the bird exclusion system.

1. Stainless steel wire mesh 12” x 12”.
2. Anchors to support framework.
3. Stainless steel cable.
4. Wire mesh to framework attachments.

B. Layout: For each run of the bird exclusion system and it’s abutment to adjacent components.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility. Furnish products from one manufacturer for the entire project.

B. Obtain all technical information on products and installation requirements from the manufacturers prior to installation.

C. Utilize only BirdMaster labor that is knowledgeable in the BirdMaster PermaMesh™ Stainless Steel Wire Mesh installations.

D. Installer Qualifications: The contractor must provide evidence of at least 3 similar projects in size and complexity which have been performed by the installer within the previous five years.

1. The Contractor must provide individual qualifications and past projects history of each installer who will work on this project.

E. Comply with all legal requirements for the correct disposal of bird waste.

1.5 DELIVERY AND STORAGE

A. Coordinate delivery of anchor bolts and other anchorage devices to be built into other construction to avoid delay.

B. Store material in a dry and protected place.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. BirdMaster: 13 Linnell Circle, Billerica, MA 01821;
Tel: 800-562-2473; Email: jjpace@birdmaster.com; Web www.birdmaster.com.

2.2 DESCRIPTION

A. Model Designation: PermaMesh™ Stainless Steel Wire Mesh.

2.3 MATERIALS

A. Wire mesh shall be a Type 304 stainless steel with a 3/4” mesh size with a PVC coating in a matte black finish. The wire thickness shall be 18 gauge (1.2 mm) in diameter.

B. The cable framework shall be a maximum of 1/16” diameter stainless steel and shall be supported by stainless steel screw eyes with an inside diameter not exceeding 3/16”. Mesh to framework connectors shall be stainless steel clips with a maximum closed inside diameter of 3/16”.

2.4 MATERIAL SOURCE

A. All parts and accessories including PermaMesh™ shall be from the manufacturer **BirdMaster**.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Surface should be thoroughly cleaned and free of bird droppings, nesting materials, rust, peeling paint or other debris.

B. Ensure that the area where the wire mesh is to be installed is cleared of extraneous debris that would hinder the installation, performance or damage to the wire mesh including.

1. Foilage.
2. Tree branches.
3. Loose stones or other objects on the structure.

C. Start of installation constitutes installer's acceptance of substrate and conditions.

3.2 INSTALLATION

A. Follow manufacturer's instructions for the PermaMesh™ stainless steel wire mesh system.

B. Stainless steel wire mesh shall be installed taut and flat. All fittings, fasteners and hardware shall be stainless steel. All mesh to structure connections shall be stainless steel cable clips.

C. Holes to be drilled into the concrete substrate only where deemed necessary and be no more than 3/16" diameter and 1" deep.

D. Provide a detailed plan of the method, materials and resources to be used in the installation of the bird exclusion system.

3.3 PROTECTION AND CLEANUP

A. The contractor shall provide protection and maintain conditions in a manner acceptable to the owner which ensures protection of masonry from damage, discoloration, or deterioration during installation of the bird exclusion system.

B. The contractor shall protect work form damage until final acceptance of the project, protect all adjacent construction and finishes from damage due to work performed under this contract.

C. The contractor shall, at the end of each workday remove all rubbish and discarded materials from the site.

3.4 HOURS OF WORK

A. The contractor shall submit to the owner no later than five (5) working days after the contract award, a phasing schedule which shows the sequence of work.

3.5 INSPECTION

A. Visually inspect the PermaMesh™ for signs of poor installation including loose screws, cables, other attachments and overall workmanship quality.

B. Immediately correct and repair where necessary.

END OF SECTION 05 50 00

SECTION 260501 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum to the General Conditions and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Raceways.
2. Building wire and connectors.
3. Supporting devices for electrical components.
4. Electrical identification.
6. Electrical demolition.
7. Cutting and patching for electrical construction.

1.3 SUBMITTALS

B. Shop Drawings: Dimensioned plans and sections or elevation layouts and single-line diagram of electricity-metering component assemblies specific to this Project.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NYCEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. All electrical work shall comply with the NYC Electrical Code.

1.5 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment that requires positioning before closing in the building.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. EMT: Electrical metallic tubing; ANSI C80.3, zinc-coated steel, with set-screw fittings.

B. FMC: Flexible metal conduit; zinc-coated steel.

C. IMC: Intermediate metal conduit; ANSI C80.6, zinc-coated steel, with threaded fittings.

D. LFMC: Liquidtight flexible metal conduit; zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.

E. RMC: Rigid metal conduit; galvanized rigid steel; ANSI C80.1.

F. Raceway Fittings: Specifically designed for raceway type with which used.

2.2 WIRES, CABLES, AND CONNECTIONS

A. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

B. Conductors, Larger Than No. 10 AWG: Stranded copper.

C. Insulation: Thermoplastic, rated 600 V, 75 deg C minimum, Type THW, THHN-THWN, or USE depending on application..

D. Cable: Type MC with ground wire.

E. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.3 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs. Strength rating to suit structural loading.

D. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

E. Expansion Anchors: Carbon-steel wedge or sleeve type.

F. Toggle Bolts: All-steel springhead type.

2.4 ELECTRICAL IDENTIFICATION

A. Identification Device Colors: Use those prescribed by ANSI A13.1, NYCEC, and these Specifications.

B. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick.

C. Tape Markers for Conductors: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

D. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

E. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape compounded for permanent direct-burial service, and with the following features:

1. Not less than 6 inches wide by 4 mils thick.
2. Embedded continuous metallic strip or core.
3. Printed legend that indicates type of underground line.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

B. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

C. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 RACEWAY APPLICATION

A. Outdoor Installations:

1. Exposed: RMC.
2. Concealed: IMC.
3. Boxes and Enclosures: NEMA 250, Type 4, unless otherwise indicated.

B. Indoor Installations:

2. Concealed in Walls or Ceilings: EMT.
3. In Concrete Slab: RNC.
4. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

3.3 RACEWAY AND CABLE INSTALLATION

A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

B. Keep legs of raceway bends in the same plane and keep straight legs of offsets parallel.

C. Use RMC elbows where RNC turns out of slab.

D. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or woven polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wires.

3.4 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

A. Application: Use wiring methods specified below to the extent permitted by applicable codes as interpreted by authorities having jurisdiction.

B. Exposed Feeders: Insulated single conductors in raceway.

C. Concealed Feeders in Ceilings, Walls: Insulated single conductors in raceway Armored cable.

D. Concealed Feeders in Concrete: Insulated single conductors in raceway.

E. Exposed Branch Circuits: Insulated single conductors in raceway.

F. Concealed Branch Circuits in Ceilings Walls: Armored cable.

G. Concealed Branch Circuits in Concrete: Insulated single conductors in raceway.

3.5 WIRING INSTALLATION

A. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.6 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials, slotted channel system components.

B. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, 200-lb minimum design load for each support element.

3.7 SUPPORT INSTALLATION

A. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used.

B. Secure electrical items and their supports to building structure, using the following methods unless other fastening methods are indicated:

1. Masonry: Toggle bolts on hollow block and expansion bolts on solid block. Seal around sleeves with mortar, both sides of wall.
2. Existing Concrete: Expansion bolts.
3. Light Steel Framing: Sheet metal screws.
4. Fasteners for Damp, Wet, or Weather-Exposed Locations: Stainless steel.
5. Light Steel: Sheet-metal screws.
6. Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

3.8 IDENTIFICATION MATERIALS AND DEVICES

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

C. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches, overall, use a single line marker.

3.12 DEMOLITION

A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

D. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.13 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair, refinish and touch up disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

END OF SECTION

SECTION 26 41 00 - LIGHTNING PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes furnishing and installing a complete lightning protection system in accordance with the standards and codes specified. An integral system is required, consisting of air terminals mounted directly on the structure to be protected.

B. The lightning protection work shall be coordinated with electrical grounding requirements and supplemental surge protection of electrical service etc.

C. Related Sections - Refer to the following sections for related work:

1. Section 260501, "Basic Electrical Work".

1.02 REFERENCES

Comply with the following applicable standards and codes:

A. National Fire Protection Association (NFPA)

1. NFPA 70 - National Electrical Code (NEC)
2. NFPA 780 - Lightning Protection Code

B. Underwriters Laboratories Inc. (UL)

1. UL 96 - Standard for Lightning Protection Components
2. UL 96A - Standard for Installation Requirements for Lightning Protection Systems
3. UL 467 - Standard for Electrical Grounding and Bonding Equipment

1.03 SYSTEM DESCRIPTION

A. The extent of lightning protection work is indicated and detailed on drawings (if furnished), and by requirements of this specification. The types of lightning protection system components specified include the following:

1. Conductors
2. Air terminals
3. Connectors
4. Splicers
5. Ground rods
6. Bonding plates

B. Protect entire structure including roof projections and weathervanes.

1.04 SUBMITTALS

A. General: Submit the following in accordance with the conditions of the Contract and Section 01300, " Submittals".

B. Product data: Submit product data for each component. Where applicable, also include recommended method(s) of installing air terminals, conductors, etc.

C. Shop Drawings: Submit scaled drawings of the lightning protection system and components for approval. Show conductor routing and accessories layouts including accessible ground wells and ground rods, counterpoise, air terminals, splicers, fasteners and connectors.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of lightning protection equipment, of types and sizes required, whose products have been in use for not less than 3 years. All components of the lightning protection systems shall be new and suitable for the application in accordance with the specified standards and shall be UL listed and labeled.

B. Installer's Qualifications: At least three years of successful installation experience on projects with lightning protection work similar to that required for this project shall be required. The installer shall be a current UL-listed company.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Handle lightning protection components carefully to avoid damage. Do not install damaged components; replace and remove damaged units from project site. Store components in original wrappings and protect from dirt, weather and construction work traffic.

1.07 WARRANTY

A. Lightning protection equipment shall be guaranteed against defective design, materials, and workmanship for the full warranty time offered by the manufacturer or supplier, but in no case less than Five years from the date of system acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The following material types, sizes, etc., shall be utilized except as noted otherwise on the contract documents:

1. Conductors: Conductors shall be bare stranded copper in the following sizes:

a. Underground counterpoise (ground loop) -- #4/0 AWG minimum (107.20. mm²), Class B stranding.

b. Main conductors (roof level between air terminals and down leads):

(1) Class I Materials - 24 strands of 14 gauge (2.08 mm²) braided smooth twist; 98,500 circular mils (50 mm²); 320 lbs. per 1000 ft. (145.2 kg per 304.8 meters) or larger.

(2) Class II Materials -- 28 strands of 0.0689 inches (0.175 cm) diameter, copper wire, rope lay, 131,500 circular mils (66.6 mm²); 420 lbs. per 1000 ft. (190.5 kg per 304.8 meters) or larger.

B. Air Terminals (Both Class I and Class II): Air terminals shall be stainless steel, minimum 1/2-inch (12.7 mm) diameter, nickel plated tip, and a minimum of 24-inches (60 cm) long.

E. Ground Rods: Ground rod material shall be copper-clad steel or solid copper. Ground rods shall be not less than 3/4" (19.05 mm) in diameter and not less than 10 ft. (3.05 m) long.

F. Connectors and Fittings:

1. Use only heavy-duty bronze connectors, splicers, bonding plates, etc., with maximum available contact surface between this hardware and each conductor or equipment.

2. Each conductor shall be held in place with at least two hex head bolts.

3. Bonding plates shall have a minimum of 8 sq. inch (412.90 cm²) of contact surface.

5. All main size connections shall contact cable for a length of 1.5" (3.81 cm) minimum.

6. Split-bolt type connectors shall not be used.

7. Connections below grade and all inaccessible splices shall use the exothermic welding process or approved irreversible compression method. Where shown on the drawings, exothermic welds and approved compression connections shall be used above grade, particular for connections to building steel and similar items.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces and conditions affecting performance of the lightning protection system. Do not proceed with installation until unsatisfactory conditions have been corrected. Contact the Architect for resolution of unsatisfactory conditions.

3.02 INSTALLATION

A. Ordinary Structures.

1. Install lightning protection systems in accordance to manufacturer's written instructions, UL 96A, and NFPA 780 and other referenced codes and standards.

2. Install air terminals as high as possible and such that the zone of protection is at least 10 inches (25 cm) higher than the structure, equipment, etc., that they are protecting.

3. A ground loop (counterpoise) and ground rods shall be installed for all new structures which require a lightning protection system. This loop and the top of ground rods shall be installed at least 2.5 ft. (0.762 m) deep in soil and between 3 ft. (0.9 m) and 8 ft. (2.5 m) from exterior of building or structure. Install marking tape 1 ft. (0.30 m) below grade above ground loop.

4. Do not use the structural steel framework as a main conductor in lieu of a copper down conductor(s).

- END OF SECTION -

SECTION 265600 - LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum to the General Conditions and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Exterior LED luminaires with ballasts and controls.
2. Interior LED lighting fixtures.

B. Related Sections include the following:

1. Section 260501 Basic Electrical

1.3 DEFINITIONS

A. CRI: Color-rendering index.

B. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 SUBMITTALS

A. Product Data: For each luminaire and support component, arranged in order of lighting unit designation. Include data on features, accessories, and finishes and the following:

1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
2. Details of attaching luminaires and accessories.
3. Details of installation and construction.
4. Luminaire materials.
5. Photometric data based on laboratory tests of each luminaire type, complete with indicated lamps, ballasts, and accessories.
6. Ballasts, including energy-efficiency data.
7. Lamps, including life, output, and energy-efficiency data.
8. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.

B. Shop Drawings:

1. Anchor-bolt templates keyed to specific poles and certified by manufacturer.

2. Design calculations, certified by a qualified professional engineer, indicating strength of screw foundations and soil conditions on which they are based.
3. Wiring Diagrams: Power **and control** wiring.

C. Samples for Verification: For products designated for sample submission in Exterior Lighting Device Schedule. Each sample shall include lamps and ballasts.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

1. Warranty Period for Luminaires: **Five** years from date of Substantial Completion.
2. Warranty Period for Metal Corrosion: **Five** years from date of Substantial Completion.
3. Warranty Period for Color Retention: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FIXTURE SCHEDULE (See Drawings E-100 & E-101)

Fixture Type	Manufacturer (or approved equal) and Description	Qty.	Finish	Notes
F	LUMENPULSE - LOGN-4W-48V-24-RGBW-10x10-HFR-BK-UCTL-ULSAMN-BK-KIT.	16	Black	LED Adjustable Strip Lighting
F-1	LUMENPULSE - LCBX-120/277-DIM/DMX/RDM-60W-BK-UL-LOGNJC-10FT-BK	16	Black	
G	Existing LED Fixture at Cast Iron Stanchion	1		Remove, clean and reinstall.
J	LUMENPULSE - LBIL-DO-120/277-RGBW-VN-LFR-DMX/RDM-FLHSSB-RBO-UL-VII	8		In ground LED fixtures
J-1	LUMENPULSE – LBI-JBOX-L-UL			See drawings E101 &E102
K	LUMENPULSE – LBIL-DO-120/277-RGBW-VN-LFR-DMX/RDM-FLHSSB-RBO-UL-VII			See drawings E101 &E102
K-1	LUMENPULSE – LBI-JOBX-L-UL			See drawings E101 &E102
L	Existing	2		Remove, clean and reinstall

M	HUBBELL – VAPORTITE V SERIES VX-151	1		
O	LUMENPULSE – PHAROS-U1-BB-FBB			See drawings E101 &E102
P	LUMENPULSE – LUMENID DMX USB HARDWARE INTERFACE			See drawings E101 &E102

2.2 LUMINAIRES, GENERAL REQUIREMENTS

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

B. Metal Parts: Free of burrs and sharp corners and edges.

C. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

D. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

E. Exposed Hardware Material: Stainless steel.

F. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

G. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

H. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

2.3 SUPPORT COMPONENTS, GENERAL REQUIREMENTS

A. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts, unless otherwise indicated.

B. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.

1. Materials: Shall not cause galvanic action at contact points.
2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication, unless stainless-steel items are indicated.
3. Anchor-Bolt Template: Plywood or steel.
4. Center Mount Hickey: Sized to accommodate Owner provided fixture.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

A. Lighting fixtures: Set level, plumb, and square with respective elements.

B. Install lamps in each luminaire.

C. Suspended Lighting Fixture Support:
1. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.

D. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources.

3.2 INSTALLATION OF INDIVIDUAL GROUND-MOUNTING LUMINAIRES

A. Excavate a 24” dia. x 8” deep hole with 6” of gravel for fixture placement and conduit runs.

B. Install housing so that faceplate will be flush with finished grade. Under no circumstances should the faceplate be below grade after installation.

C. Remove Debris Cover or CPC Cover from fixture housing.

D. Make supply sire connections to lamp holder leads. Attach Lamp Module Assembly to housing. Leave screws loose for aiming.

E. Aim horizontal and vertical light alignment as directed by Commissioner and lock setting into place.

F. Ensure that the housing o-ring and bottom of the faceplate are free of any dirt or debris and that the silicone o-ring is firmly seated in the housing groove.

G. Install the faceplate. Hand –tighten screws to 30 inch lbs., to create proper seal. Do not exceed 40 inch lbs., damage may result.

3.3 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Division 26 Section "Raceway and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.4 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

1. Verify operation of photoelectric controls.

C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain luminaires.

END OF SECTION 26 56 00

SCHEDULE A

GENERAL CONDITIONS

SECTION 1- DEFINITIONS

Whenever used in this Contract:

1. The term "RIOC" means Roosevelt Island Operating Corporation.

2. The term "Vice President of Operations" means RIOC's Vice President of Operations.

3. The term "Architect/Engineer" means the Architect or Engineer (if any) engaged by RIOC or Contractor to design the Project and provide construction phase services in connection with the Project.

4. The term "Change Order" means a written order signed by RIOC as described in Section 3.

5. The term Contractor shall mean Name of Company.

6. The term "Contract" means and includes:
   a. Standard Form Contract for Construction;
   b. General Conditions - Schedule A;
   c. Supplemental General Conditions – Schedule A1;
   d. Description of Work and Additional Terms - Schedule B1;
   e. Contract Sum Breakdown and Retainage - Schedule B2;
   f. Definitions under Articles 15-A and 17-B Regulations - Schedule C.

7. The term "Contract Sum" means the fixed price or not-to-exceed price payable to the Contractor for the Work as provided in paragraph 8 of the Standard Form Contract for Construction and Schedule B2, subject to adjustment only by Change Order as provided in Section 3 hereof.

8. The term "Contract Time" means the time for completion of the Work as set forth in paragraph 7 of the Standard Form Contract for Construction, subject to extension only by Change Order as provided in Sections 3 and 7 hereof.

9. The term "Final Completion" means completion and/or correction of all items of the Work.

10. The term "Indemnitees" means the persons identified as such in Section 13 hereof.

11. The term "Substantial Completion" means completion to the point that the Work can be used and/or occupied for its intended purposes, as solely determined by RIOC, and all approvals required for such use and/or occupancy have been received.

12. The term "Work" means the work specified and the obligations imposed upon the Contractor under this Contract.

13. The term "Extra Work" means additional work performed and/or additional material furnished beyond the original scope of the contract, and which is duly authorized and necessary for proper completion of the project, but not covered by an item in the contract, and for which, there is no means of payment, direct or indirect, provided in the contract. Such Extra Work is performed at duly negotiated prices in a Change Order.

SECTION 2 - CONFLICTING TERMS

In the event of a conflict between the terms of the Contract (including any and all attachments hereto and amendments thereof) and the terms of this Schedule A, the specific terms of this Contract shall control.

SECTION 3 - CHANGE ORDERS

Changes or Extra Work, beyond the Work specified under the Contract, or extensions of the Contract Time, may be authorized only by a written Change Order issued and signed by the President/Chief Executive Officer of RIOC or RIOC's Vice President of Operations and co-signed by the Contractor. The written Change Order shall specify: (a) the change in the Work, (b) the amount of adjustment of the Contract Sum, if applicable, and/or (c) any extension of the Contract Time.

The Contractor acknowledges that it has had ample opportunity to visit and inspect the site where the Work is to be performed and to review the drawings, specifications and all other documentation comprising the Contract. No Change Order shall be issued with respect to existing conditions at the site of the Work, except as provided in the following paragraph of this Section 3.

If conditions are encountered at the site of the Work which are (a) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Schedule B1 and the Drawings and Specifications, or (b) unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided in the Contract, then notice thereof by the Contractor shall be given to RIOC promptly before conditions are disturbed and in no event later than five (5) business days after first observance of the condition. Adjustments to the Contract Sum because of conditions discovered pursuant to this paragraph, shall be made in accordance with the procedures set forth in Schedule B2. Parties will cooperate regarding any extension required of the Contract Time. Any disputes shall be resolved by the arbitration provision set forth in Section 27 of this Schedule A.

SECTION 4 - ORDER TO PROCEED

Delivery to the Contractor of a fully executed copy of this Contract shall constitute authorization to proceed with the Work, unless a different commencement date is otherwise provided. If otherwise provided, RIOC will issue an order to proceed in writing which will set forth the date upon which the Work is to commence. All orders to proceed are subject to the Contractor's compliance with the insurance requirements of Section 14 hereof.

SECTION 5 - PERFORMANCE

The Contractor shall at all times during the Contract term remain responsible. The Contractor agrees, if

requested by President/Chief Executive Officer of RIOC or his/her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity.

The Contractor shall supervise, direct and perform the Work, using the Contractor's best skill and attention. The Contractor shall be fully responsible for and have control over and charge of construction means, methods, techniques, sequences and procedures and safety precautions and programs in connection with the Work and for coordinating all portions of the Work. The Contractor shall be fully responsible for the safety of all persons engaged in the performance of the Work and the public as well as all property that may be affected by the Work.

The Contractor shall secure and pay for all permits necessary for proper execution and completion of the Work, except for a building permit.

The Contractor shall keep RIOC informed of the progress and quality of the Work. The Contractor shall attend progress meetings as required by RIOC.

The Contractor shall perform the Work in accordance with all applicable federal, state and local laws, ordinances, codes, rules, regulations, lawful orders and standards.

The Contractor shall keep the area in which it is performing the Work free from accumulation of waste materials or rubbish caused by the Contractor's operations. At the completion of the Work, the Contractor shall remove from the site waste materials, rubbish, tools, construction equipment, machinery and surplus materials and shall leave the Work site broom clean.

SECTION 6 - PROGRESS AND COMPLETION

The Contractor shall at all times during the Contract term remain responsible. The Contractor agrees, if requested by President/Chief Executive Officer of RIOC or his or her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity.

By executing the Contract, the Contractor confirms that the Contract Time is a reasonable period for performing the Work and includes normally anticipatable adverse weather. The Contractor shall proceed expeditiously with adequate work force and shall complete the Work within the Contract Time.

SECTION 7 – DELAYS, EXTENSIONS OF TIME AND SUSPENSIONS

If the Contractor's Work is delayed by an act of RIOC or of another contractor employed by RIOC or by changes ordered by RIOC in the Work, or by labor disputes, fires, or other causes beyond the Contractor's control, or by delay authorized by RIOC, then the Contract Time shall be extended by Change Order for such reasonable time as RIOC may determine. The Contractor shall not be entitled to any extension of the Contract Time unless claim therefor is presented to RIOC as provided in Section 27.

Extension of the Contract Time as provided in this Section 7 shall be the Contractor's sole and exclusive remedy and compensation for delays, disruptions and hindrances of any kind. The Contractor agrees that it will make no claim against RIOC for increased compensation (other than extension of the Contract Time) or damages on account of any delay, disruption or hindrance due to any cause.

The President/Chief Executive Officer of RIOC, or his or her designee, in his or her sole discretion, reserves the right to suspend any or all activities under this Contract, at any time, when he or she discovers information that calls into questions the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Contract activity may resume at such time as the President/Chief Executive Officer of RIOC, or his or her designee, issues a written notice authorizing a resumption of performance under the Contract.

SECTION 8 - COMPTROLLER'S APPROVAL

In accordance with Section 2879-a of the Public Authorities Law, if this contract exceeds $1,000,000, and is not competitively bid, it may be subject to the Comptroller's approval.

SECTION 9 - TERMINATION

RIOC may terminate the Contract prospectively upon five (5) business days' written notice, for convenience or for any other reason whatsoever. In the event that the Contract is terminated, for default or cause, prior to any such termination RIOC shall give the Contractor written notice of the breach and five (5) business days to cure the breach (a "Cure Period"). Notwithstanding the foregoing, if RIOC in its sole discretion determines that a Cure Period would be futile, RIOC may terminate for default or cause without granting a Cure Period. However, if RIOC grants a Cure Period it is solely within RIOC's discretion to determine whether the breach has been cured. Additionally, RIOC may, upon determining that the Contractor's performance hereunder will endanger the public health or safety, terminate the Contract immediately. Upon termination for any reason, Contractor shall deliver all Records as defined in Sections 15 and 16 of this Schedule A within five (5) business days of termination.

Moreover, RIOC reserves the right to terminate this Contract in the event it is found that the certification filed by the Contractor in accordance with New York State Finance Law §139-k was intentionally false or intentionally incomplete. Upon such finding, RIOC shall be entitled to exercise its right of termination by providing written notice to the Contractor in accordance with the terms of the Contract.

In addition, upon written notice to the Contractor, and a reasonable opportunity to be heard with appropriate RIOC officials or staff, the Contract may be terminated by President/Chief Executive Officer of RIOC, or his or her designee, at the Contractor's expense where the Contractor is determined to the President/Chief Executive Officer of RIOC, or his or her designee, to be non-responsible. In such event, the President/Chief Executive Officer of RIOC, or his or her designee, may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach.

To the extent this agreement is a "procurement contract" as defined by State Finance Law Sections 139-j and 139-k, by signing this agreement the Contractor certifies and affirms that all disclosures made in accordance with State Finance Law Sections 139-j and 139-k are complete, true and accurate. In the event such certification is found to be intentionally false or intentionally incomplete, RIOC may terminate the agreement by providing written notification to the Contractor in accordance with the terms hereof.

SECTION 10 - PAYMENTS

Payments will be made only upon the receipt by the Vice President of Operations (or his/her designee) and the Finance Department, of a proper invoice submitted by the Contractor and that has been approved by the Vice President of Operations (or his/ her designee), in accordance with Schedule A1 and Schedule B2. The receipt of final payment electronically or the deposit of final payment by paper check by the Contractor shall constitute a waiver of any claims for payment for services rendered arising from this Contract by the Contractor against RIOC.

Payment for invoices submitted by the Contractor shall only be rendered electronically unless payment by paper check is expressly authorized by RIOC's President, in his or her sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary RIOC procedures and practices. The Contractor shall comply with RIOC's procedures to authorize electronic payments. Contractor acknowledges that it will not receive payment on any invoices submitted under this Contract if it does not comply with RIOC's electronic payment procedures, except where the RIOC President has expressly authorized payment by paper check as set forth above.

All payments for Work will be subject to the inspection, determination, and approval of Work by the Vice President of Operations (or his/her designee). RIOC may withhold payment, in whole or in part, to the extent reasonably necessary to protect RIOC from loss for which the Contractor is responsible, including loss because of: defective Work not remedied; third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to RIOC is provided by the Contractor; failure of the Contractor to make payments properly to subcontractors for labor, materials or equipment; reasonable evidence that the Work cannot be completed for the Contract Sum; damage to RIOC or another contractor; reasonable evidence that the Work cannot be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or failure to carry out the Work in accordance with the Contract.

SECTION 11 - SET-OFF RIGHTS

RIOC shall have all of its common law, equitable and statutory rights of set-off. These rights shall include, but not be limited to, RIOC's option to withhold for the purposes of set-off any moneys due to the Contractor under this contract, or any other contract with RIOC up to any amounts due and owing to RIOC with regard to this contract, any other contract with RIOC, plus any amounts due and owing to RIOC for any other reason including, without limitation, tax delinquencies, fee delinquencies or monetary penalties.

SECTION 12 - EXECUTORY CLAUSE

In accordance with Section 41 of the State Finance Law, RIOC shall have no liability under this Contract to the Contractor or to anyone else beyond funds appropriated and available for this Contract.

SECTION 13 - INDEMNIFICATION

To the fullest extent permitted by law, and in addition to any liability or obligation of the Contractor to RIOC that may exist under the Contract or by statute or otherwise, the Contractor hereby agrees to hold harmless, indemnify and defend RIOC, the New York State Urban Development Corporation d/b/a Empire State Development, the Division of Housing and Community Renewal, the State of New York,

the City of New York, and any others listed in Schedule B1 and in each and every case, their directors, officers, employees, agents, consultants or contractors (hereinafter, collectively referred to as "Indemnitees"), from and against any damages, costs, claims or liabilities which Indemnitees may sustain as a result of any and all liabilities, losses, damages, interests, judgments, liens, costs and expenses (including without limitation, reasonable counsel fees and disbursements) claims, demands, suits, actions, or proceedings which may be made or brought against Indemnitees in any way arising out of or relating to the Contract or the Work, including without limitation, the negligent acts or omissions, willful misconduct or unauthorized acts of the Contractor in the performance of the Work hereunder or of any subcontractor or other entity hired, obtained, or employed by the Contractor to provide Work in connection with the Contract. However, the Contractor shall not be obligated to hold harmless, indemnify and defend an Indemnitee to the extent of the Indemnitee's comparative negligence or willful misconduct. As a condition of the foregoing obligation, RIOC shall give the Contractor prompt notice of any claim for which indemnification is sought and shall cooperate with the Contractor in connection therewith. The Contractor shall have the right to control the defense or settlement of such claim, in its discretion, with counsel of its own choosing.

Indemnitees' directors, officers, and employees shall not be personally or individually liable to Contractor, and shall be held harmless, for any actions, losses, damages, claims, liabilities, costs or expenses (including without limitation, reasonable counsel fees and disbursements) in any way arising out of or relating to the Contract or the Work performed pursuant to it.

The Contractor agrees that this Section 13 of the General Conditions shall survive the expiration or termination of the Contract and is so noted in the insurance.

SECTION 14 - INSURANCE

The Contractor shall insure and carry the following insurance, shall require each of its subcontractors to carry the following insurance, and agrees that the following insurance shall survive the expiration or termination of the Contract:

Commercial General Liability Insurance providing both bodily injury including death and property damage insurance in a limit of not less than two million dollars ($2,000,000.00) combined single limit basis. Such insurance is to be written on an occurrence basis and shall name each of the Indemnitees as an additional insured.

Automobile Liability and Property Damage Insurance in an amount not less than five hundred thousand dollars ($500,000.00) combined single limit for both bodily injury and property damage;

Professional Liability Insurance is required if the Contractor is providing any type of design work in a limit of not less than two million dollars ($2,000,000.00) and with tail coverage for two (2) years.

The Contractor shall provide Worker's Compensation Insurance and Employer's General Liability Insurance as required under the Worker's Compensation Law.

Certificates of Insurance for all aforementioned coverages shall be provided to RIOC prior to the commencement of Work under the Contract and bear notations evidencing a minimum of 10 day cancellation notice to RIOC. The Contractor's Commercial General Liability Insurance policy shall name RIOC, the New York State Urban Development Corporation d/b/a Empire State Development, the

Division of Housing and Community Renewal, the State of New York, the City of New York and any others listed in Schedule B1 as additional insureds.

SECTION 15 - RECORDS AND ACCOUNTS

Contractor shall maintain accurate books, records, documents, accounts, maintenance manuals, warranties, blueprints, photographs, other materials and all evidence of the Work (hereinafter, collectively, "Records"). Contractor shall also maintain and provide accurate Records that provide an accounting of the specific Work performed in such form as to demonstrate the actual Work completed to perform this Contract; and shall furnish or make available such Records or other information as may be required to substantiate any report or invoice submitted to the Vice President of Operations(or his/her designee) assigned to the contract, for payment, and will also provide a copy of each invoice to the Finance Department.

Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The State Comptroller, the Attorney General and any other person or entity authorized to conduct an examination, as well as RIOC, shall have access to the Records during normal business hours at an office available, at a mutually agreeable and reasonable venue within the State of New York, for the term specified above for the purposes of inspection, auditing and copying. RIOC shall take reasonable steps to protect from public disclosure any of the Records which are exempt from disclosure under Section 87 of the Public Officers Law ("Freedom of Information Law or FOIL") provided that: (i) the Contractor shall timely inform an appropriate RIOC official, in writing, that said records should not be disclosed; and (ii) said records shall be sufficiently identified; and (iii) designation of said records as exempt under FOIL is reasonable. Nothing contained herein shall diminish, or in any way adversely affect, RIOC's right to discovery in any pending or future litigation.

As-Builts: Within five (5) business days of completion of Work, Contractor shall provide RIOC with the original design drawings which reflect any changes made to RIOC property pursuant to this Contract ("As-Built Drawings"). Such As-Built Drawings shall be e-mailed to RIOC's Vice President of Operations at Shelton.Haynes@rioc.ny.gov (or his/her designee).

SECTION 16 - OWNERSHIP OF MATERIALS

The Contractor shall provide all labor, materials and equipment necessary to perform and complete all Work. All machinery and/or replacement parts installed by the Contractor in the performance of Work pursuant to this Contract shall become and remain the exclusive property of RIOC.

Upon completion of the Work or upon termination of this Contract, all Records, products and materials, including software, collected and prepared pursuant to this Contract shall become the exclusive property of RIOC, shall be delivered to RIOC (preliminary, final or otherwise), within five (5) business days of termination and any and all rights of the Contractor to such materials shall immediately be extinguished. RIOC shall have the sole and exclusive right to utilize such materials in any way it chooses.

The Contractor agrees that it shall not use, publish, transfer or license any Work, without the prior written approval of the President/Chief Executive Officer of RIOC. The Contractor shall not use any material in any way which discloses the identity of RIOC without prior written approval from the President/Chief Executive Officer of RIOC.

SECTION 17 – ASSIGNMENT AND SUBCONTRACTING

The Contractor shall not assign, transfer, subcontract or otherwise dispose of its rights, privileges or responsibilities under the terms of this Contract, without RIOC's prior written consent, which shall be in RIOC's sole discretion. In the event there is no prior written consent from RIOC, such assignment, transfer, subcontract or other disposition shall be void.

SECTION 18 - CONFLICTS OF INTEREST

The Contractor represents that:

1. No officer, employee, agent or director of RIOC, shall participate in any decision relating to this Contract which affects his personal interest or the interests of any corporation, partnership, or association in which he is directly or indirectly interested; nor shall any officer, agent, director or employee of RIOC have any interest, direct or indirect, in this Contract.

2. The Contractor shall cause, for the benefit of RIOC, every contract with any subcontractor to include the representations contained in subsection (a) of this Section. The Contractor will take such action in enforcing such provisions as RIOC may direct, or, at its option, assign such rights as it may have to RIOC for enforcement by RIOC.

SECTION 19 - NON-COLLUSIVE BIDDING CERTIFICATION

If this contract was awarded based upon the submission of bids, Contractor affirms, under penalty of perjury, that its bid was arrived at independently and without collusion aimed at restricting competition. Contractor further affirms that, at the time Contractor submitted its bid, an authorized and responsible person executed and delivered to RIOC a non-collusive bidding certification on Contractor's behalf.

SECTION 20 - AFFIRMATIVE ACTION AND NON-DISCRIMINATION AND NEW YORK STATE BUSINESS ENTERPRISES REQUIREMENTS

1. Minority and Women-Owned Enterprises (MWBEs)

Pursuant to New York State Executive Law Article 15-A, RIOC recognizes its obligation under the law to promote opportunities for maximum feasible participation of certified minority and women-owned business enterprises and the employment of minority group members and women in the performance of RIOC contracts. The Contractor agrees to be bound by the provisions of Article 15-A and the M/WBE Regulations promulgated by the Division of Minority and Women's Business Development of the Department of Economic Development (the "Division"). If any of the terms or provisions of this Contract conflict with applicable law or regulations, such laws and regulations shall supersede these requirements.

It is the policy of RIOC to comply with all federal, State and local law, policy, orders, rules and regulations which prohibit unlawful discrimination because of race, creed, color, national origin, sex, sexual orientation, age, military status, disability, predisposing genetic characteristic, marital status or domestic violence victim status, prior criminal conviction and prior arrest, and to take affirmative action in working with contracting parties to ensure that qualified State certified Minority Business Enterprises, and qualified State certified Women-owned Business Enterprises (MBEs/WBEs), Minority Group Members and women share in the economic opportunities generated by RIOC's

participation in projects or initiatives, and/or the use of RIOC funds (from any source, including the United States of America).

RIOC is required to implement the provisions of New York State Executive Law Article 15-A and 5 NYCRR Parts 142-144 ("M/WBE Regulations") for all State contracts as defined therein, with a value (1) in excess of $25,000 for labor, services, equipment, materials, or any combination of the foregoing or (2) in excess of $100,000 for real property renovations and construction. The Contractor shall inform RIOC in writing of the individual designated as the Minority Business Enterprise Liaison responsible for administering the M/WBE and EEO programs.

For the purposes of this Contract, RIOC hereby establishes an overall goal of __ for M/WBE participation, for New York State-certified minority-owned business enterprise ("MBE") participation and for New York State-certified women-owned business enterprise ("WBE") participation (collectively "M/WBE Contract Goals") based on the current availability of MBEs and WBEs.

The Contractor agrees to use good faith efforts (5 NYCRR Part 142.8) to achieve utilization of MBEs and WBEs equal to 30% of the total value of the Work under the Contract.

Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development
Division for Small Business
One Commerce Plaza
Albany, NY 12245
Phone: (518) 474-7756 Fax: (518) 486-6416
https://ny.newnycontracts.com

The directory of minority and women-owned business enterprises is available from:

NYS Department of Economic Development
Minority and Women's Business Development Division
Phone: (855) 373-4692
mwbecertification@esd.ny.gov

Copies of the directory are also available for inspection at RIOC's main office. A current listing of certified M/WBEs may also be obtained online at https://ny.newnycontracts.com.

The directory and any listing of certified M/WBEs should not be construed as an endorsement or recommendation of any particular firm and is for use only as a resource that lists the names of businesses that qualify as M/WBE's under the definition set forth in Schedule C.

In order to maximize participation of Certified M/WBE's as subcontractors and suppliers with respect to this Contract, the Contractor is required to make the following efforts:

a. attend meetings scheduled by RIOC where bidders will be advised of general contract requirements and M/WBE program;
b. advertise, where appropriate, in general circulation media, trade association publications and

small business media;

c. notify small, minority and women contractor associations by written solicitation of specific subcontracts;
d. send written notification to Certified M/WBEs that their interest in the Work is solicited;
e. actively and affirmatively solicit bids for contracts and subcontracts from qualified State certified MBEs or WBEs, including solicitations to M/WBE contractor associations;
f. ensure that plans, specifications, request for proposals and other documents used to secure bids will be made available in sufficient time for review by prospective M/WBEs;
g. where feasible, divide the work into smaller portions to enhance participation by M/WBEs and encourage the formation of joint venture and other partnerships among M/WBE contractors to enhance their participation;
h. document and maintain records of bid solicitation, including those to M/WBEs and the results thereof. The Contractor will also maintain records of actions that its subcontractors have taken toward meeting M/WBE contract participation goals; and
i. ensure that progress payments to M/WBEs are made on a timely basis so that undue financial hardship is avoided, and, where appropriate, that bonding and other credit requirements are waived or appropriate alternatives developed to encourage M/WBE participation.

The Contractor shall include a proposed list of subcontractors and suppliers to demonstrate that the goals of this section for participation of M/WBEs will be achieved on the form entitled "Vendor/Contractor's Utilization Form". RIOC will review the submitted utilization plan and advise the Contractor of RIOC's acceptance or issue a notice of deficiency within 30 days of receipt. If a notice of deficiency is issued, the Contractor agrees that it shall respond to the notice of deficiency within seven (7) business days of receipt by submitting to RIOC a written remedy in response to the notice of deficiency. If the written remedy that is submitted is found by RIOC to be inadequate despite good faith efforts having been made by the Contractor, RIOC shall notify the Contractor and may direct the Contractor to submit, within five (5) business days, a request for a partial or total waiver of M/WBE participation goals. Without limiting any other provisions contained in the Contract Documents, RIOC may disqualify a contractor as being non-responsive under the following circumstances:

a. a contractor fails to timely submit a Vendor/Contractor's Utilization Form;
b. a contractor fails to timely submit a written remedy to a notice of deficiency;
c. a contractor fails to timely request a waiver; or
d. RIOC determines that the contractor has failed to document good faith efforts. Such documents shall include, but not necessarily be limited to:

    i. Evidence of outreach to M/WBEs;
    ii. Any responses by M/WBEs to the Contractor’s outreach;
    iii. Copies of advertisements for participation by M/WBEs in appropriate general circulation, trade, and minority or women-oriented publications;
    iv. The dates of attendance at a pre-bid, pre-award, or other meetings, if any, schedules by RIOC with M/WBEs; and
    v. Information describing specific steps undertaken by the Contractor to reasonably structure the Contract scope of work to maximize opportunities for M/WBE participation.

The Contractor shall use good faith efforts to utilize any MBE or WBE identified on the Vendor/Contractor's Utilization Form during the performance of the Contract. Requests for a partial

or total waiver of established goal requirements made subsequent to the award of the Contract may be made at any time during the term of the Contract to RIOC in writing, but must be made no later than prior to the submission of a request for final payment on the Contract. For guidance on how RIOC will determine a Contractor's "good faith efforts", refer to N.Y. Comp. Codes R. & Regs. Tit. 5, Ch. 1, Pt. 142.8. Joint ventures with Minority and Women-Owned Business Enterprises will be considered toward meeting the goals.

Commencing not more than 30 days after (i) execution of the Contract, or (ii) start of the work, the Contractor shall submit to the RIOC a Contractor's Quarterly or Monthly M/WBE Contractor Compliance & Payment Report of the workforce actually utilized on the project, itemized by ethnic background, gender, and Federal Occupational Categories or other appropriate categories specified by RIOC. Pursuant to Executive Order #162, the Contractor shall also submit a Workforce Utilization Report, and shall require each of its Subcontractors to submit a Workforce Utilization Report, in such form as shall be required by RIOC on MONTHLY or QUARTERLY basis during the term of the Contract. Separate forms shall be completed by the Contractor and any Subcontractors. Contractors and subcontractors are also required to report the gross wages paid to each of their employees for the work performed by such employees on the Contract. Completed forms should be emailed to Muneshwar.Jagdharry@rioc.ny.gov.

Accuracy of the information contained in the reporting documentation (Vendor/Contractor Workforce Utilization Report and Contractor's Quarterly M/WBE Contractor Compliance & Payment Report) shall be certified to by an owner or officer of the Contractor.

In accordance with Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, national origin, age, disability or marital status. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this Contract shall be performed within the State of New York, the Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this Contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 thereof, the Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this Contract.

In the event RIOC determines a Contractor to be non-compliant with Article 15-A M/WBE requirements, RIOC will notify said Contractor in writing of the delinquency. The written notice will provide a specified time within which the Contractor may cure any delinquency, as outlined in section 142.12 of Title 5 of the New York Codes, Rules and Regulations. In addition, the notice may propose an action to correct the problem and also provide the contractor an opportunity to propose a suitable, alternative corrective action. In the event that the parties are unable to resolve the dispute, RIOC may refer the matter to the Division of Minority and Women's Business Development for resolution in accordance with section 142.12 of Title 5 of the New York Codes, Rules and

Regulations.

RIOC and the Contractor recognize the necessity of correcting the effects of discrimination in public procurement and that the socio-economic benefits and enforcement of the non-discrimination provisions set forth herein are significant but will include items of loss whose amounts will be incapable or very difficult of accurate estimation. As such, in accordance with 5 NYCRR §142.13, the Contractor acknowledges that if it is found by RIOC to have willfully and intentionally failed to use good faith efforts (as defined in N.Y. Comp. Codes R. & Regs. Tit. 5, Ch. 1, Pt. 142.8) in order to comply with the M/WBE participation goals set forth in the Contract, such finding constitutes a material breach of contract and RIOC may withhold payment from the Contractor not as a penalty, but as liquidated damages. Such liquidated damages shall be calculated as ten percent (10%) of the difference between (1) all sums identified for payment to M/WBEs had the Contractor achieved the contractual M/WBE goals and (2) all sums actually paid to M/WBEs for work performed or materials supplied under the Contract. In the event a determination has been made which requires the payment of liquidated damages and such sums have not been withheld by RIOC, the Contractor shall pay such liquidated damages to RIOC within sixty (60) days after they are assessed unless prior to the expiration of such sixtieth day, the Contractor shall file a complaint with the Director of the Division of Minority and Women's Business Development in the Department of Economic Development (the "Director") pursuant to subdivision 8 of section 313 of the Executive Law in which event the liquidated damages shall be payable if Director renders a decision in favor of RIOC.

2. Service-Disabled Veteran-Owned Business Act Requirements

Article 17-B of the New York State Executive Law provides for more meaningful participation in public procurement by certified Service-Disabled Veteran-Owned Businesses ("SDVOB"), thereby further integrating such businesses into New York State's economy. RIOC recognizes the need to promote the employment of service-disabled veterans and to ensure that certified service-disabled veteran-owned businesses have opportunities for maximum feasible participation in the performance of RIOC contracts.

In recognition of the service and sacrifices made by service-disabled veterans and in recognition of their economic activity in doing business in New York State, Contractor is expected to consider SDVOBs in the fulfillment of the requirements of the Contract. Such participation may be as subcontractors or suppliers, as protégés, or in other partnering or supporting roles.

a. Contract Goals

i. RIOC hereby establishes an overall goal of __ for SDVOB participation, based on the current availability of qualified SDVOBs. For purposes of providing meaningful participation by SDVOBs, the Contractor should reference the directory of New York State Certified SDVOBs found at: https://ogs.ny.gov/veterans/ and https://online.ogs.ny.gov/SDVOB/search. Questions regarding compliance with SDVOB participation goals should be directed to the RIOC Procurement Department. Additionally, following Contract execution, Contractor is encouraged to contact the Office of General Services' Division of Service-Disabled Veterans' Business Development at 518-474-2015 or VeteransDevelopment@ogs.ny.gov to discuss additional methods of maximizing participation by SDVOBs on the Contract.

ii. Contractor must document "good faith efforts" to provide meaningful participation by SDVOBs as subcontractors or suppliers in the performance of the Contract (see clause IV

below).

b. SDVOB Utilization Plan

i. In accordance with 9 NYCRR § 252.2(i), Contractor was required to submit a completed SDVOB Utilization Plan on Form SDVOB 100 with its bid.

ii. The Utilization Plan must list the SDVOBs that the Contractor intends to use to perform the Contract, a description of the work that the Contractor intends the SDVOB to perform to meet the goals on the Contract, the estimated dollar amounts to be paid to an SDVOB, or, if not known, an estimate of the percentage of Contract work the SDVOB will perform. By signing the Utilization Plan, the Bidder acknowledged that making false representations or providing information that shows a lack of good faith as part of, or in conjunction with, the submission of a Utilization Plan is prohibited by law and may result in penalties including, but not limited to, termination of the Contract for cause, loss of eligibility to submit future bids, and/or withholding of payments. Any modifications or changes to the agreed participation by SDVOBs after the Contract award and during the term of the Contract must be reported on a revised SDVOB Utilization Plan and submitted to RIOC.

iii. RIOC has reviewed the submitted SDVOB Utilization Plan and advised the Contractor of RIOC's acceptance or issued a notice of deficiency within 20 days of receipt.

iv. If a notice of deficiency was issued, Contractor agrees that it shall respond to the notice of deficiency, within seven business days of receipt, by submitting to RIOC a written remedy in response to the notice of deficiency. If the written remedy that is submitted is not timely or is found by RIOC to be inadequate, RIOC shall notify the Contractor and direct the Contractor to submit, within five business days of notification by RIOC, a request for a partial or total waiver of SDVOB participation goals on SDVOB 200. Failure to file the waiver form in a timely manner may be grounds for termination of the Contract.

v. RIOC may terminated the Contract under the following circumstances:
   1) If Contractor fails to submit an SDVOB Utilization Plan;
   2) If Contractor fails to submit a written remedy to a notice of deficiency;
   3) If Contractor fails to submit a request for waiver; or
   4) If RIOC determines that the Contractor has failed to document good faith efforts.

vi. Contractor hereby certifies that it will follow the submitted SDVOB Utilization Plan for the performance of SDVOBs on the Contract pursuant to the prescribed SDVOB contract goals set forth above.

vii. Contractor further agrees that a failure to use SDVOBs as agreed in the Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, RIOC shall be entitled to any remedy provided herein, including but not limited to, a finding of Contractor non-responsibility.

c. Request for Waiver

i. Prior to submission of a request for a partial or total waiver, Contractor shall speak to the

Designated Contacts at RIOC for guidance.

ii. In accordance with 9 NYCRR § 252.2(m), a contractor that is able to document good faith efforts to meet the goal requirements, as set forth in clause IV below, may submit a request for a partial or total waiver on Form SDVOB 200, accompanied by supporting documentation. A contractor may submit the request for waiver at the same time it submits its SDVOB Utilization Plan. If a request for waiver is submitted with the SDVOB Utilization Plan and is not accepted by RIOC at that time, the provisions of clauses II (C), (D) & (E) will apply. If the documentation included with the Contractor's waiver request is complete, RIOC shall evaluate the request and issue a written notice of acceptance or denial within 20 days of receipt.

iii. Contractor shall attempt to utilize, in good faith, the SDVOBs identified within its SDVOB Utilization Plan, during the performance of the Contract. Requests for a partial or total waiver of established goal requirements made subsequent to Contract award may be made at any time during the term of the Contract to RIOC, but must be made no later than prior to the submission of a request for final payment on the Contract.

iv. If RIOC, upon review of the SDVOB Utilization Plan and Monthly SDVOB Compliance Report (SDVOB 101) determines that Contractor is failing or refusing to comply with the contract goals and no waiver has been issued in regards to such non-compliance, RIOC may issue a notice of deficiency to the Contractor. The Contractor must respond to the notice of deficiency within seven business days of receipt. Such response may include a request for partial or total waiver of SDVOB contract goals.

v. Waiver requests should be sent to RIOC.

d. Required Good Faith Efforts

In accordance with 9 NYCRR § 252.2(n), Contractors must document their good faith efforts toward utilizing SDVOBs on the Contract. Evidence of required good faith efforts shall include, but not be limited to, the following:

i. Copies of solicitations to SDVOBs and any responses thereto.
ii. Explanation of the specific reasons each SDVOB that responded to Contractors' solicitation was not selected.
iii. Dates of any pre-bid, pre-award or other meetings attended by Contractor, if any, scheduled by RIOC with certified SDVOBs whom RIOC determined were capable of fulfilling the SDVOB goals set in the Contract.
iv. Information describing the specific steps undertaken to reasonably structure the Contract scope of work for the purpose of subcontracting with, or obtaining supplies from, certified SDVOBs.
v. Other information deemed relevant to the waiver request.

e. Monthly SDVOB Contractor Compliance Report

In accordance with 9 NYCRR § 252.2(q), Contractor is required to report Monthly SDVOB Contractor Compliance to RIOC during the term of the Contract for the preceding month's

activity, documenting progress made towards achieving the Contract SDVOB goals. This information must be submitted using form SDVOB 101 available on the Office of General Services website (www.ogs.ny.gov) and should be completed by the Contractor and submitted to RIOC, by the 10th day of each month during the term of the Contract, for the preceding month's activity to: Muneshwar.Jagdharry@rioc.ny.gov with a copy to Natalee.Grant-Henriques@rioc.ny.gov.

f. Breach of Contract and Damages

In accordance with 9 NYCRR § 252.2(s), any Contractor found to have willfully and intentionally failed to comply with the SDVOB participation goals set forth in the Contract, shall be found to have breached the contract and Contractor shall pay damages as set forth therein.

ALL FORMS ARE AVAILABLE AT: https://ogs.ny.gov/veterans/

3. EEO Policy Statement

a. The Contractor and subcontractors shall undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status. For these purposes, affirmative action shall apply in the areas of recruitment, employment, job assignment, promotion, upgradings, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.

b. Prior to the award of the Contract, the Contractor shall submit an Equal Employment Opportunity ("EEO") Policy Statement to RIOC within the time frame established by RIOC.

c. The Contractor's EEO Policy Statement shall contain, but not necessarily be limited to, and the Contractor, as a precondition to entering into a valid and binding Contract, shall, during the performance of the Contract, agree to the following:

i. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, sexual orientation, or marital status, will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on Contract. Affirmative action pertains to recruitment, employment, job assignment, promotion, upgradings, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.

ii. The Contractor shall state in all solicitations or advertisements for employees that, in the performance of the Contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

iii. At the request of RIOC, the Contractor shall request each employment agency, labor union,

or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein.

iv. The Contractor shall comply with the provisions of the Human Rights Law, all other State and Federal statutory and constitutional non-discrimination provisions. The Contractor and subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.

v. The Contractor will include the provisions of subdivisions (a) through (d) immediately above in every subcontract in such a manner that the requirements of the subdivisions will be binding upon each subcontractor as to work in connection with the Contract.

4. Prohibition of Contracts With Entities That Support Discrimination

In accordance with Executive Order No. 177 Regarding Prohibiting Contracts with Entities that Support Discrimination ("EO 177"), the Contractor hereby certifies that it does not have institutional policies or practices that fail to address the harassment and discrimination of individuals on the basis of their age, race, creed, color, national origin, sex, sexual orientation, gender identity, disability, marital status, military status, or other protected status under the Human Rights Law. The Contractor further certifies that it submitted EO 177 Certification to RIOC prior to contract award.

5. Nondiscrimination in Employment in Northern Ireland: MacBride Fair Employment Principles

In accordance with Chapter 807 of the Laws of 1992 the Contractor certifies that if it or any individual or legal entity in which the Contractor holds a 10% or greater ownership interest, or any individual or legal entity that holds a 10% or greater ownership interest in the Contractor has business operations in Northern Ireland, such Contractor, shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles relating to nondiscrimination in employment and freedom of workplace opportunity regarding such operations in Northern Ireland, and shall permit independent monitoring of their compliance with such Principles.

The Omnibus Procurement Act of 1992, requires that by signing this bid/proposal, Contractors certify that whenever the total bid amount is greater than $1 million:

a. The Contractor has made reasonable efforts to encourage the participation of New York State Business Enterprises as suppliers and subcontractors on this project, and has retained the documentation of these efforts to be provided upon request to RIOC;

b. The Contractor has complied with the Federal Equal Opportunity Act of 1972 (P.L. 92-261), as amended;

c. The Contractor agrees to make reasonable efforts to provide notification to New York State residents of employment opportunities on this project through listing of any such positions with the Job Service Division of the New York State Department of Labor, or providing such notification in such manner as is consistent with existing collective bargaining contracts or agreements. The contractor agrees to document these efforts and to provide said documentation to RIOC upon request;

d. The Contractor acknowledges notice that New York State may seek to obtain offset credits from foreign countries as a result of this Contract and agrees to cooperate with the State in these efforts.

6. **Failure to comply with all of the foregoing requirements found in this Section may result in a finding of non-responsiveness, non-responsibility or breach of the Contract, leading to the withholding of funds, suspension or termination of the Contract or such other actions or enforcement proceedings as allowed by the Contact and at law**

SECTION 21 - ENVIRONMENTAL PROTECTION

The Contractor certifies and warrants that all heavy duty vehicles, as defined in New York State Environmental Conservation Law ("ECL") §19-0323, to be used under this Contract, will comply with the specifications and provisions of ECL §19-0323 and any regulations promulgated pursuant thereto, which requires the use of Best Available Retrofit Technology ("BART") and Ultra Low Sulfur Diesel ("ULSD"), unless specifically waived by the New York State Department of Environmental Conservation ("DEC"). Qualifications for a waiver under this law will be the responsibility of the Contractor.

SECTION 22 - MATERIALS AND WORKMANSHIP

The Contractor hereby agrees and guarantees that all Work furnished under the Contract will conform to the terms of this Contract, as to kind, quality, function, design and characteristics of materials and workmanship. The Contractor shall adhere to professional standards and shall reprocess at its expense, all work necessary to correct errors directly caused by malfunction of the Contractor's machines or mistakes of Contractor's Personnel. RIOC agrees to cooperate with the Contractor in the performance of the Work hereunder, including without limitation and upon prior consent of RIOC's designated representative, providing consultant with reasonable and timely access to facilities, data, information, and RIOC personnel.

The Contractor shall promptly correct Work rejected by RIOC, or deemed by RIOC to be defective or failing to conform to the requirements of the Contract. The Contractor shall bear all costs of correcting such Work, including, without limitation, additional testing and inspections.

The Contractor warrants that the Work will be of good quality and new unless otherwise required or permitted by the Contract, and that the Work will be free from defects not inherent in the quality required or permitted and will conform to the requirements of the Contract.

If, within one (1) year after Substantial Completion, the Work is found to be not in accordance with the Contract requirements, the Contractor shall correct it promptly after receipt of written notice from RIOC.

Nothing contained herein shall be construed to establish a period of limitation with respect to other obligations the Contractor might have under the Contract. Establishment of the time period of one (1) year as provided above relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations.

If the Contractor fails to correct defective or non-conforming Work as required or fails to carry out Work in accordance with the Contract, RIOC, by written order, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract and fails within five (5) business days after receipt of written notice from RIOC to commence and continue correction of such default or neglect with due diligence and promptness, RIOC may, without prejudice to other remedies RIOC may have, correct such deficiencies and the costs of correcting such deficiencies shall be deducted from payments to the Contractor. If the payments then or thereafter due the Contractor are not sufficient to cover such costs, the Contractor shall pay the difference to RIOC.

SECTION 23 - PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS

The Contractor certifies and warrants that all wood products to be used under this contract award will be in accordance with, but not limited to, the specifications and provisions of Section 165 of the State Finance Law, (Use of Tropical Hardwoods) which prohibits purchase and use of tropical hardwoods, unless specifically exempted, by RIOC. Qualification for an exemption under this law will be the responsibility of the Contractor to establish to meet with the approval of RIOC.

In addition, when any portion of this Contract involving the use of woods, whether supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid proposal that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in Section 165 of the State Finance Law. Any such use must meet with the approval of RIOC; otherwise, the bid may not be considered responsive. Under bidder certifications, proof of qualification for exemption will be the responsibility of the Contractor to meet with the approval of RIOC.

SECTION 24 - IRAN DIVESTMENT ACT

By entering into this Agreement, Contractor certifies in accordance with State Finance Law Section 165-a that it is not on the "Entities Determined to be Non-Responsive Bidders/Offerers pursuant to the New York State Iran Divestment Act of 2012" ("Prohibited Entities List") posted at:

http://www.ogs.ny.gov/about/regs/docs/ListofEntities.pdf

The Contractor further certifies that it will not utilize on this Contract any subcontractor that is identified on the Prohibited Entities List. The Contractor agrees that should it seek to renew or extend this Contract, it must provide the same certification at the time the Contract is renewed or extended. The Contractor also agrees that any proposed Assignee of this Contract will be required to certify that it is not on the Prohibited Entities List before the contract assignment will be approved by RIOC.

During the term of the Contract, should RIOC receive information that a person (as defined in State

Finance Law Section 165-a) is in violation of the above-referenced certifications, RIOC will review such information and offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment activity which is in violation of the Act within 90 days after the determination of such violation, then RIOC shall take such action as may be appropriate and provided for by law, rule, or contract, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

RIOC reserves the right to reject any bid, request for assignment, renewal or extension for an entity that appears on the Prohibited Entities List prior to the award, assignment, renewal or extension of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the Prohibited Entities List after contract award.

SECTION 25 - CONFIDENTIALITY

The Contractor agrees that all deliverables, developed in the course of providing the Work, are strictly confidential between the Contractor and RIOC, and except as specified herein the Contractor may not reveal or disclose such work product, without permission from RIOC, or unless ordered by a court of competent jurisdiction, governmental authority or administrative agency or required to be disclosed by law, subpoena, or similar process.

SECTION 26 - LABOR LAW

If this Contract involves the employment of laborers, workmen or mechanics under Articles 8 or 9 of the Labor Law or constitutes a building service contract covered by Article 9 thereof, neither the Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days set forth therein, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the New York State Labor Department. Furthermore, the Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the New York State Labor Department in accordance with the Labor Law. Contractor shall submit certified payrolls with each payment application. Where applicable by Labor Law, see Schedule B2 of this Contract for the Prevailing Rate Case Number (PRC#) that has been assigned to this project.

SECTION 27 - CLAIMS AND DISPUTE RESOLUTION

1. The Contractor shall proceed with the Work promptly as instructed or ordered by RIOC. The Contractor shall have no right to suspend all or any part of the Work or refuse to comply with any written instruction, direction or order of RIOC pending resolution of any dispute or for any other reason, provided that RIOC continues to make payments of undisputed amounts as provided in the Contract. Any such suspension or refusal will be a material breach of the Contract. The Contractor may preserve whatever right, if any, the Contractor may have to make claim with respect to any written instruction, order, direction, action or inaction of RIOC or others by giving notice as required by paragraph (b) of this Section 27 and by advising RIOC in writing, prior to proceeding with the Work in question, that the Contractor is proceeding under protest.

2. The Contractor must give written notice to RIOC of any claim by the Contractor for extension of time, extra compensation, price increase or damages of any sort within five (5) business days after the Contractor first learns of the act, omission, occurrence or circumstance on which the claim is

based. The purpose of this notice is to give RIOC prompt opportunity (a) to cancel or revise orders or directions, change plans, mitigate or remedy circumstances giving rise to the claim or to take other action that may be desirable; (b) to monitor and verify the facts and circumstances as they occur; and (c) to verify any costs and expenses claimed by the Contractor contemporaneously as they are incurred. Written notice is required whether or not RIOC is aware of the facts and circumstances that constitute the basis of the Contractor's claim, and no action, inaction, or conduct of RIOC or any other person will be regarded as a waiver of such notice requirement except only a statement to that effect signed by RIOC. Failure of the Contractor to give written notice as required shall be deemed conclusively to be a waiver and release of any claim, and such notice shall be a condition precedent to the Contractor's right to make any claim arising out of, under or in connection with the Contract or its performance of the Work. Notice pursuant to this paragraph (b) of Section 27 shall be addressed and sent to RIOC in accordance with Section 36 of these General Conditions. Notice of claim given to any person other than RIOC shall not constitute notice to RIOC.

It shall be within RIOC's sole discretion whether to submit to arbitration any dispute, claim or controversy arising out of, or relating to, the Contract or the breach, termination, enforcement, interpretation or validity thereof (including the determination whether work performed under the Contract is within the Scope of Work) and including the determination of the scope or applicability of this arbitration provision (collectively, referred to as "Claims"). If RIOC determines that a Claim shall be submitted to arbitration, such arbitration shall be before the American Arbitration Association ("AAA") in New York County (or another arbitration tribunal of RIOC's choosing) with the parties sharing equally in the costs of the arbitration process and each party bearing their own legal costs and expenses. Further, it shall be in RIOC's sole discretion whether the arbitration shall be before one or three arbitrators. Judgement on an arbitration award may be entered in any court having jurisdiction. This clause shall not preclude parties from seeking provisional remedies in aid of arbitration from a court of competent jurisdiction.

SECTION 28 - INTERNATIONAL BOYCOTTS

1. In accordance with Section 220-f of the Labor Law and Section 139-h of the State Finance Law and the regulations of the Comptroller of the State of New York promulgated thereunder, where the Contract is for the construction, reconstruction, maintenance and/or repair of public work or for work performed or to be performed in an amount exceeding five thousand dollars, the Contractor hereby promises, asserts and represents that neither the Contractor nor any substantially owned or affiliated person, firm partnership or corporation has participated, is participating or shall participate in an international boycott in violation of the provisions, of the United States Export Administration Act of 1969, as amended, or the United States Export Administration Act of 1979, or the regulations of the United States Department of Commerce promulgated under either act.

2. RIOC awards this Contract in material reliance upon the promise and representation made by the Contractor in the foregoing paragraph. This Contract shall be rendered void by the State Comptroller if subsequent to the execution of this Contract, the Contractor or such owned or affiliated person, firm, partnership or corporation has been convicted of a violation of the above Acts or Regulations or has been found upon final determination of the United States Commerce Department or any other appropriate agency of the United States to have violated such Acts or Regulations.

3. The Contractor shall notify the State Comptroller of any such conviction or final determination of violation in the manner prescribed by the Comptroller's regulations after such determination within

five (5) days. The Contractor shall deliver a copy of the notice to RIOC.

SECTION 29 - GRAND JURY, INVESTIGATIONS, TESTIMONY

The Contractor agrees to comply with the provisions of Sections 2876 and 2877 of the Public Authorities Law, and any subsequent amendments. The provisions require that upon the refusal of a person, when called before a grand jury, head of a state department, temporary state commission or other state agency, the organized crime task force in the department of law, head of a city department, or other city agency, which is empowered to compel the attendance of witnesses and examine them under oath, to testify in an investigation concerning any transaction or contract with the state, any political subdivision thereof, a public authority or with any public department, agency or official of the state, any political subdivision thereof, or a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant questions concerning such transaction or contract,

1. such person, and any firm, partnership or corporation of which (s)he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with any public authority or public benefit corporation or any official thereof for goods, work or services, for the period of five years after such refusal or until such disqualification shall be removed pursuant to Public Authorities Law Section 2877, and

2. any and all contracts with any public authority or public benefit corporation or official thereof, since the effective date of this law, by such person and by any firm, partnership, or corporation of which he or she is a member, partner, director or officer, may be canceled or terminated, but any monies owing by the public authority or public benefit corporation for goods delivered or work done prior to the cancellation or termination shall be paid.

SECTION 30 - ILLEGALITY

If this Contract contains any unlawful provision, the same shall be deemed of no effect and shall, upon the application of either party, be deemed stricken from this Contract without affecting the binding force of the remainder.

SECTION 31 - ENTIRE AGREEMENT

This Contract integrates all agreements, representations and warranties prior to the date hereof, whether oral or written, between the parties, and constitutes the entire Contract between the parties hereto.

SECTION 32 - GOVERNING LAW

This Contract shall be construed in accordance with the laws of the State of New York.

SECTION 33 - COUNTERPARTS

This Contract may be executed in any number of counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same instrument.

SECTION 34 - MODIFICATIONS

This Contract shall not be modified except by amendment or Change Order in writing dated and signed by all parties hereto.

SECTION 35 - BINDING EFFECT

This Contract shall be binding upon, extend to, and inure to the benefit of the legal representatives, successors and valid assigns of the respective parties.

SECTION 36 - NOTICE

Except where otherwise provided, any written notice or communication required or permitted pursuant hereto by either party to the other party shall be in writing and either:

1. delivered by certified mail, postage prepaid, return receipt requested to the parties at their respective addresses set forth at page 1 of this Contract; or
2. provided by fax transmission and confirmed by regular mail, if to RIOC, at (212) 832-4582, and if to the Contractor, at the number supplied by the Contractor to RIOC; or
3. provided by email, if to RIOC, to Assistant Chief Financial Officer at Muneshwar.Jagdharry@rioc.ny.gov with a copy to General Counsel at LegalDepartment@rioc.ny.gov, and if to the Contractor, at the email address supplied by the Contractor to RIOC.

SECTION 37 - ALL LEGAL PROVISIONS DEEMED INCLUDED

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 and is 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.

SECTION 38 - COMPLIANCE WITH NEW YORK STATE INFORMATION SECURITY BREACH AND NOTIFICATION ACT

Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa; State Technology Law Section 208).

SCHEDULE A1

SUPPLEMENTAL GENERAL CONDITIONS

SECTION 1 - SCHEDULE OF VALUES

1. Submit a printed schedule on AIA Forms G702 and G703 – Application and Certification for Payment Continuation Sheet to the Vice President of Operations (or his/her designee) for approval.
2. Forms filled out by hand will not be accepted.
3. Submit Schedule of Values within 15 days after Notice to Proceed, for approval by the Vice President of Operations (or his/her designee).
4. Format: Utilize the Table of Contents of the Specifications. Include mobilization and demobilization.
5. Include within each line item, a direct proportional amount of the Contractor's Overhead and profit.
6. Revise schedule to list approved Change Orders, with each Application of Payment.

SECTION 2 - PAYMENTS

On or about the 21st of each month the Contractor shall submit to the Vice President of Operations (or his/her designee), a pencil copy of payment application detailing work to be completed through the end of the month. The Vice President of Operations(or his/her designee) shall within seven (7) days of receipt, review and return to Contractor, a mark-up of said payment application with a determination of percentages of work completed and materials stored to date that shall be paid. The Contractor must submit certified payrolls with each payment application to the Vice President of Operations (or his/her designee) for approval prior to payment.

SECTION 3 - INSPECTIONS AND REJECTIONS

All Work and all construction, processes of manufacture and methods of construction involved in or related to the performance of the Work shall be at all times and places subject to the inspection of the Vice President of Operations (or his/her designee), and the enumeration in these Specifications of particular portions of such Work, construction, processes of manufacture or methods of construction which will or may be inspected by the Director of Engineering, his/her designee, or the Architect/Engineer shall not be deemed to imply that only such Work, construction, processes of manufacture and methods of construction will or may be so inspected or that any element of the Work is not subject to inspection by the Vice President of Operations (or his/her designee). The Vice President of Operations (or his/her designee) shall be the judge of the quality and suitability of the Work, construction, processes of manufacture and methods of construction for the purposes for which they are used or to be used. Should they fail to meet the approval of the Vice President of Operations (or his/her designee), they shall be forthwith reconstructed, made good, replaced or corrected, as the case may be, by the Contractor at its own expense. Rejected material shall be removed immediately from the site. The fact that the Architect/Engineer has approved the materials and workmanship shall not relieve the Contractor from its obligation to supply other material and workmanship when so ordered by the Vice President of Operations (or his/her designee).

The Contract Drawings do not show all of the details of the Work and are intended only to illustrate the character and extent of the Work to be performed. Accordingly, they may be supplemented during the performance of the Work by the Architect/Engineer or by the Contractor subject to the approval of the Vice President of Operations (or his/her designee), to the extent necessary to further illustrate the Work.

An indication on the Contract Drawings of the existence, nature or location of any utilities, structures, obstructions, conditions or materials does not constitute a representation as to the conclusions to be drawn therefrom nor a representation that no others exist in addition to those shown, even in the same location; nor does the absence of any indication on said drawings of the existence, nature or location of any utilities, structures, obstructions, conditions or materials constitute a representation that none exist. After the Contract has been executed, the Contractor will be furnished three (3) copies of the Specifications and Contract Drawings without charge.

SECTION 4 - FINAL INSPECTION

When, in the opinion of the Contractor, the construction is completed and ready for final inspection, he shall so notify the Vice President of Operations (or his/her designee) in writing and the Vice President of Operations (or his/her designee) will conduct an inspection of said construction (including any portions with respect to which Certificates of Partial Completion have been issued). Before any Certificate of Final Completion will be issued, any defects or omissions noted on this inspection must be corrected by the Contractor.

SECTION 5 - CONSTRUCTION REQUIRED BY THE SPECIFICATIONS

The Specifications require the doing of all things necessary or proper for or incidental to the scope of the Work, as shown on the Contract Drawings in their present form. In addition, all things shown on the Contract Drawings even though not expressly mentioned in the Specifications, all things mentioned in the Specifications even though not shown on the Contract Drawings, and all things not specified either on the Contract Drawings or in the Specifications but involved in carrying out their intent and in the complete and proper execution of the Work are required by the Specifications; and the Contractor shall perform the same as though they were specifically delineated, described and mentioned. In case of a conflict between a requirement of the Contract Drawings and a requirement in Schedule B1, the requirement of Schedule B1 shall control. In case of a conflict between a requirement contained in the Specifications and a requirement of the Contract Drawings, Contractor shall notify the Vice President of Operations(or his/her designee) to resolve any conflict.

Some Sections of the Specifications make cross references to construction specified in other Sections of the Specifications, including cross references intended to avoid duplication by the bidders in quoting prices and to point out some of the necessity for coordination. Such cross references are not intended to be complete or all inclusive, and the Contractor shall ascertain for himself both the nature and the extent of all construction which may be related to that under each Section of the Specifications whether or not expressly referred to.

Some Sections of the Specifications contain a general description of the construction under such Sections. Such a general description is not intended to define the construction required by the Specifications and Contract Drawings. Accordingly, such description shall be construed as in aid of and supplemental to, but in no case limiting, impairing or decreasing, the requirements elsewhere set forth with respect to the construction to be performed.

The Contractor's compensation for all construction whatsoever referred to in the Specifications and Contract Drawings in their present form, even though the need for certain items of such construction may be contingent upon future occurrences or determinations or upon other circumstances, shall be deemed to be included in the price(s) quoted by the Contractor in the Form of Contract unless the

Specifications or Contract Drawings expressly state that compensation in addition to such price shall be payable for such items of construction. The express statement in some cases to the effect that certain construction shall be without additional cost to RIOC shall not impair the application of this paragraph in other cases. The distribution of various parts of the construction among the Divisions and Sections of the Specifications or among the Contract Drawings is not intended as a representation of the most effective or logical method of organizing, scheduling or subcontracting the construction, and the Contractor shall ascertain for itself how to do so unless otherwise expressly prescribed in this Contract.

SECTION 6 - AVAILABLE PROPERTY

Subject to the conditions elsewhere stated herein, those areas to be occupied by the permanent construction will be made available to the Contractor upon the commencement of his first operations at the construction site. RIOC has no obligation to make other areas available to the Contractor for staging, storage or otherwise. Any additional property which the Contractor desires for its operations shall be obtained by the Contractor at its own expense.

The Contractor will be permitted to use only so much of the areas made available to the Contractor as is necessary for the performance of the Contract, and the Contractor must at all times so conduct its operations as not to encroach upon or block the portions used by others. The Vice President of Operations (or his/her designee) may at any time make joint or exclusive assignments of particular portions thereof, either to the Contractor or to others, and may take over and use for other purposes any portions which, in the opinion of Vice President of Operations (or his/her designee), are not required for the performance of the Contract.

The Contractor shall perform daily clean-up the areas made available to the Contractor so that they are free at all times of refuse, rubbish, scrap material or debris and so that the construction site presents a neat, orderly and workmanlike appearance.

SECTION 7 - SHOP DRAWINGS, CATALOG CUTS AND SAMPLES

The Contractor shall specifically prepare for this Contract all Shop Drawings which may be required in addition to the Contract Drawings or in addition to any other drawings which the Architect/Engineer may issue in supplementing the Contract Drawings. The specific requirements elsewhere set forth in the Specifications for furnishing Shop Drawings, Catalog Cuts and samples for any particular portion of the Contract shall not limit the obligation of the Contractor to furnish Shop Drawings, Catalog Cuts and samples for any other portion when so required by the Vice President of Operations(or his/her designee).

The Contractor shall submit – for review and approval by the Vice President of Operations (or his/her designee) – a general "Submittal Schedule" listing the planned transmittal date and estimated number in each Specifications section category of Shop Drawings, Catalog Cuts, pages of calculations and samples within seven (7) calendar days after receipt by the Contractor of the acceptance of the Proposal. A more detailed schedule shall be submitted no less than five (5) calendar days prior to the actual date of any submittal. The “Submittal Schedule” shall follow the form (if any) provided by the Vice President of Operations (or his/her designee) for this Contract.

After checking and verifying all field measurements and after complying with applicable procedures specified hereunder, the Contractor shall transmit submittals to the Vice President of Operations (or his/her designee) for Architect/Engineer review and approval, in accordance with the approved schedule

of Shop Drawing submissions, or for other action if so indicated by the Vice President of Operations (or his/her designee).

All submissions shall be identified as the Architect/Engineer may require. In general, submissions shall specifically reference Contract Drawing numbers or Specifications section numbers for which the item pertains. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, conformance to the specified performance and design criteria, materials, test results and similar information to enable the Architect/Engineer to review each submittal as required.

The Contractor shall also submit all Catalog Cuts and samples to the Vice President of Operations (or his/her designee) for Architect/Engineer review and approval pursuant to the approved submittal schedule, for conformance to the requirements of the Contract Drawings and Specifications. All Catalog Cuts and samples shall have been reviewed by the Contractor and shall be accompanied by a specific written indication that the Contractor has reviewed the submittal for conformance with the Contract Drawings and Specifications and shall be identified clearly as to material, supplier, manufacturer's procedures and pertinent data such as catalog numbers and the use for which intended.

Before submission of each Shop Drawing, Catalog Cut and sample, the Contractor shall have determined and verified all quantities, dimensions, conformance to the specified performance and design criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed and coordinated each Shop Drawing or Catalog Cut with other Shop Drawings and Catalog Cuts and with other requirements of the Work.

At the time of each submission, the Contractor shall give the Architect/Engineer specific written notice of each variation in any Shop Drawing, Catalog Cut and sample from the requirements of the Contract Drawings or Specifications and, in addition, shall cause a specific notation of each such variation to be made on each submittal to the Architect/Engineer, for review and approval of each such variation.

The Architect/Engineer's review and approval of Shop Drawings, Catalog Cuts or samples shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Drawings or Specifications unless the Contractor has in writing called the Architect/Engineer's attention to each such variation at the time of submission as required hereunder and the Architect/Engineer has given written approval of each by an express specific written notation thereof incorporated in or accompanying the Shop Drawing, Catalog Cut or sample approval. Approval of Shop Drawings, Catalog Cuts and samples which are inconsistent with the requirements of the Contract Drawings and Specifications shall not be deemed to waive or change such requirements or to relieve the Contractor of its obligations to perform such requirements unless the Architect/Engineer shall expressly and specifically state that he is waiving or changing such requirements, as stated above.

Where a Shop Drawing, Catalog Cut or sample is required, no related Work shall be performed prior to the Architect/Engineer's review and approval of the submission. Upon receipt of the submittal, the Architect/Engineer will review the Shop Drawing, Catalog Cut or sample for conformance to the design information and materials shown on the Contract Drawings and contained in the Specifications. Approval by the Architect/Engineer shall not constitute a complete review or approval of the means, methods, techniques, sequences or procedures of construction, except where a specific means, method, technique, sequence or procedure of construction is specifically delineated in or required by the Contract Drawings or Specifications, and the approval shall not constitute a review and approval in regard to safety precautions or programs incident thereto. The review and approval of a separate item will not in

itself indicate approval of the assembly in which the item functions. Any design shown on the Shop Drawings and prepared by the Contractor, its subcontractors, their detailers or their professional engineers is the complete responsibility of the Contractor. Within seven (7) working days after receipt of the Shop Drawing prints, the Architect/Engineer will approve or not approve the same or require corrections or additions to be made thereon. When a shop drawing is not approved or if additions or corrections are required, the Architect/Engineer will return within five (5) working days two of the copies submitted and the Contractor shall make the revisions, corrections or additions shown thereon to be made. The Contractor shall direct specific attention in writing to revisions other than the corrections called for by the Architect/Engineer on the previous submittal. Each drawing shall be corrected as required until the approval of the Architect/Engineer is obtained. After each resubmission, the Architect/Engineer shall have five (5) working days in which to approve revisions or corrections.

As soon as approval has been given no change will be permitted thereon unless approved in writing by the Vice President of Operations (or his/her designee).

Before final payment for the Work is made, the Contractor shall furnish to the Vice President of Operations (or his/her designee) one set of approved Shop Drawings and Catalog Cuts, which have previously been prepared by the Contractor in accordance with requirements elsewhere specified in these Specifications.

SECTION 8 - RECORD DRAWINGS

Additionally, before final payment is made, the Contractor shall submit one set of contract plans, all clearly revised, completed and brought up to date showing the permanent construction as actually made. These drawings shall be marked "RECORD DRAWING", dated and signed by the Contractor and be in the form of Mylar reproducibles, from which clear prints can be made. By signature, the Contractor is verifying that the drawings reflects the as-constructed condition.

SECTION 9 - SUBSTITUTION

Where a proprietary item or make is specified or mentioned herein or called for or mentioned on the Contract Drawings and the phrases "similar and equal to" or "approved equal" are used in connection therewith, the utilization of any other item or make will be deemed a substitution. Substitution for the proprietary item or make specifically named may be made only in accordance with the Section of the General Conditions entitled "Materials and Workmanship" and in accordance with the following.

Whenever materials or equipment are specified or described in the Contract Drawings or Specifications by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of another supplier or manufacturer may be accepted by the Vice President of Operations (or his/her designee) if sufficient information and proof is submitted by the Contractor to permit the Vice President of Operations (or his/her designee) to determine that the material or equipment proposed is equivalent or equal to that named and the Architect/Engineer approves the substitution.

The Vice President of Operations (or his/her designee) may require the Contractor to furnish at the Contractor's expense a special performance guarantee or other assurance with respect to any approved substitution. Furthermore, the approval of any substitute proprietary item or make shall not in any way

entitle the Contractor to additional compensation therefor.

Notwithstanding such approval, however, the Contractor assumes the risk that such approved substitute item or make is not equal to that shown or specified and if at any time the substitution shall appear not to be so equal the Contractor shall replace the substitution with that originally shown on the Contract Drawings or called for in the Specifications at its own cost and reimburse RIOC for any loss occurring on account of the substitution failing to be equal, notwithstanding that it had been previously approved for use by the Architect/Engineer.

SECTION 10 - COORDINATION

1. Coordinate scheduling, submittals, and work of the various sections of the Specifications to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

2. Notify affected utility companies and comply with their requirements.

3. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

4. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

5. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

6. Coordinate completion and clean-up of work of separate sections.

7. After RIOC's occupancy of premises, coordinate access to the site for correction of defective Work not in accordance with Contract Documents, to minimize disruption of RIOC's activities.

8. Submit coordination drawings to the Vice President of Operations (or his/her designee) for review, signed off by all trades before the installation of any Work.

SECTION 11 - PROGRESS SCHEDULE

Schedule Requirements:

1. Within fifteen (15) calendar days after acceptance of the Contractor’s Proposal, the Contractor shall, at its own expense, prepare a detailed electronic progress schedule for the Director of Engineering's review (or review by his/her designee) and approval. The progress schedule shall show the dates for the commencement and completion of the items of Work of the Contract and all Contract Milestones. The Contractor shall revise and resubmit the progress schedule until approved by the Vice President of Operations (or his/her designee). The progress schedules/graphics required by this Contract shall be produced in a format acceptable to the Vice President of Operations (or his/her designee).

2. Progress schedules shall be sufficiently detailed to accurately depict all the Work (including any design, key submittals, procurement, and construction activities performed by the Contractor) and shall graphically represent the logical sequence and duration of activities, all in accordance with the requirements of the Contract. The information provided in progress schedules shall also include, but not be limited to, the interdependencies between the Contractors' activities and all other activities required for the successful completion of the Contract, e.g., those to be performed by utility companies or by other entities. All Milestone dates specified in the Contract shall be represented in the schedule by Milestone activities that are logically interrelated to the work that must be accomplished in order to achieve the Milestone.

3. Progress schedules shall be updated monthly and submitted to Vice President of Operations (or his/her designee) for review and approval. The Contractor shall update the progress schedule showing for each such item of work of the Contract the actual start dates, physical percent complete, expected completion dates (for activities in progress), a brief narrative explaining how the planned completion will be achieved and the actual completion dates. No logic or duration changes shall be made therein without the written approval of the Vice President of Operations (or his/her designee).

4. Approval of any progress schedule shall not relieve the Contractor of its obligation to complete the Work by the time(s) required in the Contract and in accordance with all other Contract provisions, even though the schedule approved may be inconsistent with such completion.

5. The submittal of progress schedules under this section shall not be deemed to be a substitute for the reporting requirements of the “Daily Progress Reports”.

SECTION 12 - DAILY PROGRESS REPORTS

The Contractor shall furnish to the Vice President of Operations (or his/her designee) at the end of each day Work is performed at the construction site, a Daily Progress Report showing for that day stating:

1. The location and type of construction performed.
2. The type of equipment used identifying each piece of equipment as owned by the Contractor or rented from others.
3. A statement of any unusual occurrence.
4. Weather conditions
5. The names and number of workers in each trade classification that were employed.

Such reports shall not be deemed to be a substitute for the notices, time slips, memoranda or other data required under provisions of the Contract relating to compensation for Extra Work.

SECTION 13 - HOURS OF WORK

Subject to all requirements stated elsewhere herein, the Work shall be performed between the hours of 8:00 AM and 4:30 PM Monday through Friday.

If Contractor shall require performing Work during hours other than those listed above, Contractor shall submit to the Vice President of Operations (or his/her designee), at least one week in advance, the proposed schedule of hours of Work for approval.

Contractor shall not perform Work at the construction site outside of these time periods or on a Federal or New York State legal holiday unless otherwise authorized in writing by the Vice President of Operations (or his/her designee).

SECTION 14 - CONTRACTOR'S MEETINGS

The Contractor shall conduct job progress and coordination meetings with subcontractors in the Contractor's field office or on the job site every two weeks, or as frequently as job conditions require or the Architect/Engineer may request. The Architect/Engineer shall be notified and, at the Architect/Engineer's option, may attend these meetings. The Contractor shall prepare and distribute minutes to the Architect/Engineer and the subcontractors within forty-eight (48) hours of the day following the meetings. The Contractor shall attend separate job progress and coordination meetings with the Vice President of Operations (or his/her designee) every two weeks, or at times otherwise requested by Vice President of Operations (or his/her designee).

SECTION 15 - CONTRACTOR'S FIELD OFFICE AND REPRESENTATIVE

At a readily accessible point on or near the construction site, the Contractor shall maintain a field office provided with a telephone.

During the performance of any Work at the construction site, the Contractor shall have a representative thereat who shall be authorized by the Contractor to receive and put into effect promptly all orders, directions and instructions from the Vice President of Operations(or his/her designee). The Contractor's representative shall be provided, at all times, with a conformed copy of this Contract and a set of the Contract Drawings.

If an oral instruction is given, Contractor shall promptly memorialize the instruction in writing to the Vice President of Operations (or his/her designee), and the instruction will stand only upon written confirmation by the Vice President of Operations (or his/her designee). For any orders regarding a change in the Work, Extra Work, repairs, replacements and the like, Contractor must follow the process for Change Orders set forth in Section 3 of Schedule A.

SECTION 16 - TEMPORARY STRUCTURES

Unless otherwise provided in this Contract, the Contractor shall determine the need for and shall design, furnish and construct all barricades, fences, staging, formwork, shoring, scaffolding and other temporary structures required in the performance of the Contract, whether or not of the type enumerated in the Specifications or on the Contract Drawings, including those which would be required by law or regulation if this Contract were being performed for a private corporation. All such temporary structures shall be of adequate strength for the purposes for which they are constructed and shall be provided with graphics, warning signs and warning lights as required informing personnel and the public of the hazards being protected against, and the Contractor shall maintain them in satisfactory condition. The design and drawings for such structures are to be prepared by the Contractor, and when requested by the Vice President of Operations (or his/her designee) they shall be submitted for review by the Vice President of Operations (or his/her designee) before being used. Neither such approval, however, nor any

requirements of the Vice President of Operations(or his/her designee), the Specifications or the Contract Drawings shall relieve the Contractor of responsibility for the design, construction and use of the temporary structures or from any obligations and risks imposed on the Contractor under this Contract, and any such approval or requirements shall be deemed merely to relate to minimum standards and not to indicate that the temporary structures are adequate or that they meet the Contractor's obligations under this Contract. The temporary structures shall be removed from the construction site following completion of the Work.

SECTION 17 - TEMPORARY SANITARY FACILITIES

The Contractor shall make arrangements for securing and shall pay all costs for temporary toilets, wash facilities and drinking water including toilet tissue, paper towels, paper cups and similar disposable materials for use by the Contractor, subcontractors or other persons over whom the Contractor has control. The Contractor shall comply with all applicable regulations and health codes. The Contractor shall install facilities where directed by RIOC, and remove from RIOC property when no longer required.

SECTION 18 - SAFETY PROVISIONS

In the performance of the Contract, the Contractor shall exercise every precaution to prevent injury to workers and the public or damage to property.

The Contractor shall, at its own expense, provide temporary structures (as provided above), place such watchmen, design and erect such barricades, fences and railings, give such warnings, display such lights, signals and signs, exercise such precaution against fire, adopt and enforce such rules and regulations, and take such other precautions as may be necessary, desirable or proper, or as may be directed.

All employees on the Work shall carry valid and current photo identification whenever they are working at the site. All employees on the Work shall be certified as having successfully completed the OSHA 10-hour construction safety and health course. Copies of each employee’s identification and OSHA certification shall be submitted to the Vice President of Operations (or his/her designee) for his record.

The Contractor shall conduct weekly Tool Box Talks on site. A copy of meeting agenda shall be signed by all attendees and submitted to the Vice President of Operations (or his/her designee).

The Contractor shall employ for Work of the Contract a competent person conforming to the requirements of the Code of Federal Regulations 29 CFR 1926.32(f) who shall be designated by the Contractor as authorized to perform the duties required by 29 CFR 1926 et seq. as applicable for Work of this Contract.

The Contractor shall obtain and submit to the Vice President of Operations (or his/her designee) one copy of material safety data sheet (MSDS) conforming to the requirements of 29 CFR 191O.1200(g) for each hazardous chemical utilized for permanent and consumable materials employed for Work of this Contract.

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss, including but not limited to:

1. All employees on the Work, the public and other persons and entities who may be affected thereby;
2. All the Work, materials and equipment to be incorporated therein, whether in storage on or off the site; and
3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and the Contractor has removed all workers, material and equipment from the construction site, or the issuance of the Certificate of Final Completion, whichever shall occur last.

Until fire protection needs are supplied by permanent facilities under this Contract, the Contractor shall install and maintain temporary fire protection facilities. The Contractor shall comply with requirements of National Fire Protection Association NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alteration and Demolition Operations". The Contractor shall employ only such workers as are physically fit and are free from contagious or communicable diseases. The Contractor shall use only machinery and equipment adapted to operate with the least possible noise, and shall so conduct its operations that annoyance to occupants of nearby property and the general public will be reduced to a minimum. The bringing of intoxicating substances onto the construction site and the use or consumption of intoxicating substances at the construction site is prohibited. It shall be the responsibility of the Contractor to insure that all employees of the Contractor and of all subcontractors, material men and any other persons under contract to or under the control of the Contractor shall comply with the provisions of this paragraph.

Before the Certificate of Final Completion of Work will be issued, the Contractor shall remove all surplus materials, false work, temporary fences and other temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from its operations and shall put the construction site in a neat, orderly condition. In the event the Contractor encounters at the construction site, material reasonably believed to be asbestos, polychlorinated biphenyl (PCB) or any other hazardous material, the Contractor shall immediately stop Work in the area affected and report the condition in writing to the Vice President of Operations(or his/her designee). Work in the affected area shall not thereafter be resumed by the Contractor except upon the issuance of a written order to that effect from the Vice President of Operations (or his/her designee).

Within fifteen (15) days of the acceptance of its Proposal, the Contractor shall submit to the Vice President of Operations (or his/her designee), for review, the Contractor's Site Safety Program, which shall be specific for the construction site and include a description of the Work to be performed, a hazard assessment of the Work to be performed and the means by which such hazards shall be mitigated. The Contractor's Site Safety Program shall comply with all applicable federal, state, municipal and local and departmental laws and shall include, among other things, the designation by the Contractor of a qualified individual to administer such Site Safety Program.

SECTION 19 - ACCIDENTS AND FIRST AID PROVISIONS

The Contractor shall promptly report in writing to RIOC all accidents whatsoever arising out of or in connection with the performance of the Contract, whether on or adjacent to the construction site, which result in death, injuries or property damage, giving full details and statements of witnesses. In addition,

if death or serious injuries or serious damage is caused, the accident shall be reported immediately by telephone to the Vice President of Operations (or his/her designee).

The Contractor shall provide at the construction site such equipment and medical facilities as are necessary to supply first aid service, in case of accident, to any who may be injured in the progress of the Contract. The Contractor shall have standing arrangements for the removal and hospital treatment of any person who may be injured while engaged in the performance of the Contract.

If any claim is made by any third person against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the fact in writing to RIOC giving full details of the claim.

SCHEDULE B1

DESCRIPTION OF WORK AND ADDITIONAL TERMS

SECTION 1 - DESCRIPTION OF THE WORK

This Project description is a summary only and is therefore general in nature, and does not limit Contract Work as stipulated in other parts of the Contract Documents. Refer to every part of the Contract Documents for the total Work included, since the Contractor is responsible for every part of the Work indicated in their Contract Documents whether or not it is included in the following limited summary. The General Construction Contractor is responsible for all Work indicated in the Contract Documents.

SECTION 2 - LIST OF DRAWINGS AND SPECIFICATIONS

DRAWINGS issued date

SPECIFICATIONS

REPORTS

SECTION 3 - SPECIAL INSTRUCTIONS AND REQUIREMENTS

Contractor acknowledges that the Site is owned by the State of New York. Building materials and equipment purchased and incorporated in the improvements constructed on the Site pursuant to this Agreement will become the sole property of Roosevelt Island Operating Corporation immediately upon such purchase and installation. As a public benefit corporation and political subdivision of the State of New York, RIOC is exempt from New York State taxes. Therefore, all procurement made on RIOC's behalf in connection with this project shall not include New York State taxes. Any payments of New York State taxes made by contractor or its subcontractors in connection with this project will not be reimbursed under this contract.

Uniform: Technician must wear clothing and other gear that clearly identifies which company they work for, and carry personal ID at all times. The company logo and name must be visible at all times, regardless of the weather.

Deliveries of materials or equipment to the Island must notify LiRo, via e-mail, no fewer than 24 hours prior to arriving. Notification must include name of individual(s), name of company, purpose of visit, time of arrival and vehicle information (make, model, year, color and license plate number). This information will be provided to security for cross-checking. Failure to provide this information in not less than 24 hours prior to the visit may result in denial of access to the Island. The contractor shall be responsible for all material deliveries to the Island. LiRo and RIOC are not responsible for any misplaced, lost or stolen property.

See Logistics, and Vehicle Information **for information including, but not limited to: Island Speed Limit, Vehicle Access, Island Access/Egress Routes, Emergencies and Additional Permits.**

No access will be allowed to the interior of any unoccupied building on Roosevelt Island Operating Corporation unless authorized. If access to buildings is required, RIOC/LiRo will make the necessary arrangement through or on behalf of the Owner. Once access is authorized, the contractor must lock doors at the end of the work day, leave the lights off (or as they found them), and leave all other items as they found them.

At the end of each work day the contractor must perform a thorough site cleaning to remove any garbage, debris, equipment and materials from the surrounding work area. Any garbage must be removed using contractor supplied containers. All work sites must be kept neat, clean and hazard free.

In case of power outages, the contractor must have on hand their own generators, flashlights, and localized heating units so work will not be affected.

Warning signs and traffic safety devices shall be provided, installed, maintained and removed by the Contractor.

This Contractor will be required to maintain a strict "No Smoking" Policy on site in accordance with the Department of Buildings mandate.

Internal combustion engines will not be used on this project for any work in interior spaces unless proper ventilation and/or scrubbers are provided, and testing assures atmosphere is per OSHA guidelines.

Caution or "Danger Tape" shall not be considered as acceptable barriers.

Material must be stored in approved RIOC/LiRo locations. This Contractor is responsible to remove all excess material remaining on site (from their work only). Excess material or material lying loose on site that creates a hazard will be removed by RIOC/LiRo at the Contractor's cost.

This Contractor shall verify the presence of all existing underground utilities that may be affected by their work. This includes all excavations within the property line and job site footprint. This Contractor will contact "one Call" for work outside of the property limits. This Contractor shall transfer this information onto a drawing immediately after the survey to retain this information. A preplanning meeting must be held with the RIOC/LiRo superintendent and the proper planning documents submitted before any work proceeds.

All equipment, materials, and debris are required to be secured or removed from the project until the building is enclosed, to prevent accidental displacement and wind-driven damage.

Coordination with Other Contractors

During the progress of the Work on this Contract, other Contractors may be engaged in performing work within the Contract area and in areas adjacent to this Contract area.

The Contractor's attention is specifically directed to the fact that because of the work on other contracts within and adjacent to the limits of this Contract, it may not have exclusive occupancy of the

territory within or adjacent to the limits of this Contract.

The Contractor will be required to cooperate with other Prime Contractors and the owners of the various utilities and to coordinate and arrange the sequence of its work in such a manner that all work, proposed or in progress within or adjacent to the limits of the Contract, can be progressed with as little interference as possible.

In case of interference between the operations of a Contractor and/or utility owners and/or other Contractors, RIOC/LiRo shall be the sole judge of the rights of each party and of the sequence for work necessary to expedite the completion of all the Work progressed or about to be progressed within or adjacent to the Contract limits.

The direction of RIOC/LiRo on the order and sequence of the Work shall not constitute a basis for extra compensation or an Extension of Time

Meetings

General:
Meetings shall be held as scheduled by RIOC/LiRo in its office, at which time the Contractor shall have its representatives present to discuss all details relative to the execution of the Work.

RIOC/LiRo Project Manager shall preside over these meetings and may choose to record the minutes thereof. Prior to each meeting, the RIOC/LiRo PM will consult with the Contractor and will prepare an agenda of items to be discussed. In general, after informal discussion of any item on the agenda, the RIOC/LiRo PM will summarize the discussion in a brief written statement.

Pre-Construction Meetings:
After the Contract has been awarded, but prior to the start of actual construction, a Pre-Construction Meeting will be scheduled by the RIOC/LiRo PM.

The first meeting may be attended by representatives of RIOC/LiRo, A/E, Contractor, subcontractors as requested, and the RIOC/LiRo PM. The purpose of this Meeting will be generally administrative and will include, but not necessarily be limited to, discussion of the RIOC/LiRo PM and RIOC requirements, use of subcontractors, submissions required from the Contractor prior to start of work, major equipment deliveries and priorities, construction procedures, payment criteria, time for completion, and any specific or unique criteria to be followed. Subsequent meetings shall be attended by parties as deemed necessary by the RIOC/LiRo PM.

Progress Meetings**:**
Regular Progress Meetings will be held at least twice a month at the RIOC/LiRo Field office during the performance of the Work of this Contract, when possible and useful. Additional Meetings may be called as progress of the Work dictates. A responsible representative from each subcontractor is required to attend progress meetings as required by the RIOC/LiRo PM.

Responsible representation by subcontractors, suppliers and major equipment manufacturers will be the Contractor's responsibility at Progress Meetings, on demand from the RIOC/LiRo PM. Refer to all Divisions of the Technical Specifications for other requirements.

Suggested Minimum Agenda

1. Review minutes of previous meetings.
2. Review progress of work since last meeting.
3. Note and identify problems, which impede planned progress.
4. Develop corrective measures and procedures to regain planned Schedule.
5. Revise Construction Schedule as indicated and plan progress during next work period.
6. Plan to maintain quality and work standards.
7. Complete other current business.

Laws and Ordinances

All Contractors must correct safety violations as discovered by RIOC/LiRo personnel in a timely manner as required. The Contractor accepts the Contract Documents, submitted by the RIOC/LiRo PM, on the basis that such Contract Documents do not constitute a release of responsibility on the part of the Contractor to know and supervise the actual construction in all its parts, so that such construction complies with all legal regulations. The Contractor shall be held to be both responsible and accountable for any damage, which RIOC/LiRo may suffer as a result of non-compliance with any or all legal regulations.

The Work shall be performed by the Contractor, in all respects, in strict conformity to all laws, rules, regulations, requirements and ordinances of the federal, state, and local governments and all departments and bureaus thereof, and of the New York City ordinance codes and laws governing the Site and work. Should the Contract Documents conflict with the law, the Contractors shall immediately notify the RIOC/LiRo PM in writing of such conflict, and shall thereafter follow the written instructions of the RIOC/LiRo PM in respect thereto; or should the Contract Documents require more than the law requires, the Contract Documents shall be followed nevertheless.

Each Prime Contractor shall obtain and pay for all permits and fees required for the Work performed under its Contract. All electrical work shall comply with the N.E.C. and the respective Contractor will be required to furnish for its work Underwriters Certificates issued by Underwriters Laboratories for compliance.

Compliance with the foregoing requirements shall not relieve the Contractor of any other of its obligations under this Contract.

Permits

The Contractor shall make the necessary arrangements for, and obtain all permits required for its work, including, if it wishes to use City landfills, construction and demolition waste disposal dump tickets pursuant to Board of Estimate Resolution No. 66, (June 21, 1973), paying the costs and expenses thereof, except in those cases where the Contract may provide otherwise.

Contractor Submissions

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.

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. Contractor shall direct its subcontractor to prepare shop drawings for submission to the Architect/Engineer in accordance with the requirements of these "General Conditions".

The Contractor shall:

1. Review and be responsible, to the RIOC/LiRo PM or RIOC's authorized representative, for information shown on subcontractor's shop and Installation Drawings and manufacturer's data, and also for conformity to Contract Documents.
2. Clearly designate which trade is to perform the work when the use of "work by others" or other similar phrases are indicated on the drawings, before submission to the Architect/Engineer.
3. Stamp submissions Recommended for Approval, date and forward to the RIOC/LiRo PM or its authorized representative.

All shop drawings submitted by the Contractor, which involve a change at variance with the Contract Drawings, shall be noted by the Contractor, by advising the A/E and the RIOC/LiRo PM in writing, as to the recommended change and the reason therefore.

Contract Drawings are for design, engineering and general arrangement purposes only and are not to be used as shop drawings.

Contractor Responsibilities:

1. Before submitting shop drawings to the A/E and RIOC/LiRo PM, all submittals from subcontractors, manufacturers or suppliers shall be sent directly to the Contractor for preliminary review, coordination and checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of material or equipment. The Contractor shall thoroughly check all drawings for accuracy and conformance to the intent of the Contract Documents. Drawings found to be inaccurate or otherwise in error, shall be returned to the subcontractor, manufacturers, or suppliers by the Contractor for correction.
2. Before being submitted to the A/E and RIOC/LiRo PM, shop drawings shall bear the Contractor's signature of approval, certifying that they have been so checked. Submittals without the Contractor's signature of approval will not be reviewed by the A/E and RIOC/LiRo PM and will be returned to the Contractor.
3. Shop drawings shall be submitted as a single package, including all associated drawings for any operating system and shall include all items of equipment and any mechanical units involved or necessary for the functioning of such system. Where applicable, the submittal shall include elementary wiring diagrams showing circuit functioning and necessary interconnecting wiring diagrams for construction.
4. If the submittals contain any departures from the Contract Documents, specific mention thereof shall be made in the Contractor's letter of transmittal. Otherwise, the review of such submittals shall not constitute approval of the departure. The Contractor shall call the A/E and RIOC/LiRo PM's attention to any changes by the use of a large rubber stamp, or by larger letters on shop drawings. If this is not done, even if the work is incorporated into the construction, it will not be accepted by the A/E and RIOC/LiRo PM, even if shop drawings are "Approved".
5. No materials or equipment shall be ordered, fabricated or shipped or any work performed until

the A/E returns to the Contractor the submittals herein required, annotated “Approved”. Will be done at contractor’s risk.
6. Where errors, deviations, and/or omissions are discovered at a later date in any of the submittals, the A/E’s prior review of the submittals does not relieve the Contractor of the responsibility for correcting all errors, deviations and/or omissions.

Record Drawings:
A. NOTE TO CONTRACTORS: All professional seals must be blocked out. Title box complete with Project title and Consultant’s names will remain.
B. The Contractor shall maintain, during the progress of the Work, an accurate record of the Work as actually installed, on Record Drawings, PDF and in ink. These Record Drawings shall be made available to the RIOC/LiRo PM upon request.
C. 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. Drawings should also show all connections, valves, gates, switches, cut-outs and similar operating equipment.
D. Before Substantial Completion payment, the Contractor shall furnish to the RIOC/LiRo PM, one (1) complete set of Record Drawings, in ink, indicating all of the Work and locations as actually installed, plus one (1) Electronic copy of the Record Drawings.
E. Record Drawings shall be of the same size as that of the Contract Drawings, with a 1/2-inch marginal space on three sides and a 2-inch marginal space on the left side.
F. Each Record Drawing shall bear the legend “RECORD DRAWING”, in heavy block lettering, 1/2-inch high and contain the following data:
[Cross-References to the Section Number, detail number and paragraph number of the Contract Specifications.]

RECORD DRAWING

Contractor’s Name . . . . . .

Contractor’s Address . . . . . .

Made by . . . . Date . . . . . .

Checked by . . . . Date . . . . . .

Commissioner’s Representative The LiRo Group, Owner’s Representative

G. Record Drawing Title Sheet. The Contractor shall prepare a title sheet, same size as Record Drawings and contain the following:
1. Heading: Roosevelt Island Operating Corporation Facility Contract: [Description of Trade] Contract No.
2. RIOC Contract No.
3. Name of the Project and Location
4. Contractor’s Name
5. Record of Changes (A Caption description of work affected, and the date and No. of Change order or other authorization).
6. List of Record Drawings

H. All changes from Contract Drawings shall be conspicuously encircled and identified by change order number, correlating to changes listed on “Title Sheet”.

The Contractor shall show within the encircled areas, the Work as actually installed.

I. 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, it shall furnish three (3) sets thereof, so that the RIOC 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 the book form for the Contract.

Coordination Drawings/Composite Drawings:

A. Coordination Drawings/Composite Drawings shall be completed by the Contractor within thirty (30) days from the Notice to Proceed.

B. Coordination Drawings/Composite Drawings shall be initiated, completed and submitted for distribution, so as not to delay the construction.

Layout and Installation Drawings:

A. Layout and Installation Drawings shall be completed by the Contractor in accordance with the approved schedule.

B. Layout and Installation Drawings, submitted for review by the RIOC/LiRo PM, shall include all utilities, structures, equipment, pipes, valves, fittings, drains, ventilation ducts, all electrical, heating, ventilating and other conduits, electrical cable trays, lighting fixture layouts and circuiting, instrumentation, power supply, alarm circuits, etc., under this Contract.

Operation and Maintenance Manuals:

Two (2) copies of Preliminary Operation and Maintenance Manuals shall be submitted with the shop drawings for each major item of equipment.

Maintenance and Lubrication Schedules:

A maintenance and lubrication schedule for each piece of equipment shall be submitted with the shop drawings. Submission shall be seven (7) copies.

Samples:

Samples and shop drawings, which are related to the same unit of work or Specification Section, shall be submitted at the same time. If related shop drawings and samples are submitted at different times, they cannot be reviewed until both are furnished to the A/E and the RIOC/LiRo PM.

Coordination Drawings Requirements:

A. The General Construction Contractor shall coordinate the installations of the Contract by means of Coordination Drawings, as specified herein. The Coordination Drawings may lack complete data in certain instances, pending receipt of shop drawings, but sufficient space shall be allotted for the items affected. When final information is received, such data shall be promptly inserted on the Coordination Drawings.

B. The General Construction Contractor shall prepare a set of mylar transparencies, indicating equipment and appurtenances, at not less than 3/8-inch scale. The Drawings shall also show beams, ceiling heights, walls, floor-to-floor dimensions, floors, partitions, columns, windows, door and other

major architectural and structural features shown on the Drawings. Two sets of prints from the transparencies shall be furnished to the RIOC/LiRo PM to review for conformance with the intent of this Section. Corrections, if required, shall be made to the transparencies.

C. In the preparation of all the Coordination Drawings, Composite Drawings, large scale details, as well as cross and longitudinal sections, shall be made as required, or as directed by the RIOC/LiRo PM, to fully delineate all conditions. Particular attention shall be given to the locations, size and clearance dimensions of equipment items, shafts and similar features. In preparing the Coordination Drawings, minor changes in conduit routings, that do not affect the intended function, may be made as required to avoid space conflicts, when mutually agreed upon, but items may not be resized or exposed items relocated without the RIOC/LiRo PM's approval. No changes shall be made in any wall or chase locations, ceiling heights, door swings or locations, windows or other openings, or other features affecting the function or aesthetic effect of the building. If conflicts or interferences cannot be satisfactorily resolved, the RIOC/LiRo PM shall be notified and its decision obtained.

D. Should any problems of coordination require architectural or structural change of design, the change shall be submitted to the RIOC/LiRo PM for resolution.

E. After the General Construction Contractor's set of mylars has been coordinated and all necessary changes have been made, the RIOC/LiRo PM shall hold a final coordination meeting where these Drawings shall then be signed-off by the Contractor, indicating its awareness of, and agreement with, the indicated routings and layouts and their interrelationship with the adjoining or contiguous work. Thereafter, no unauthorized deviations will be permitted and if made without the knowledge or agreement of the RIOC/LiRo PM, will be subject to removal and correction at no additional cost to RIOC.

F. After the final Coordination Drawings have been agreed upon and signed by the Contractor, the General Construction Contractor shall provide and distribute four (4) copies of each to himself and (15) copies to the RIOC, for reference and record purposes. The Contractor desiring additional copies of such Drawings, beyond the basic distribution indicated above, shall arrange and pay for cost of same.

G. The record copies of the final Coordination Drawings shall be retained by the Contractor as a working reference. All shop drawings, prior to their submittal to the RIOC/LiRo PM and the A/E, shall be compared with the Coordination Drawings and developed accordingly by the Contractor responsible. Any revisions to the Coordination Drawings, which may become necessary during the progress of the Work, shall be noted by the Contractor and shall be neatly and accurately recorded on the copies. The Contractor shall be responsible for the up-to-date maintenance of its own record copies of the Coordination Drawings and to keep one copy available at the Site. The Coordination Drawings and any subsequent changes thereto, shall be utilized by the Contractor in the development of its As-built Drawings.

H. No extra compensation will be paid by RIOC to the Contractor for relocating conduit or other material that has been installed without proper coordination between the Contractor and the trades involved.

I. All changes in the Work on the Contract, whether a change in price is given or not, shall be shown on the Coordination Drawings.

J. All work on the Coordination Drawings shall be performed by competent draftsmen, in a clear, legible manner. The RIOC/LiRo PM shall be the sole judge of the acceptability of the Coordination Drawings.

K. Coordination Drawings shall not be used for "As-built" Drawings.

Samples

General:
A. Where required in the Specifications or otherwise requested by RIOC/LiRo PM or A/E, samples of any material to be used and of the finish to be applied in the Work, shall be submitted by the Contractor for approval in accordance with the General Conditions, Article GC 16, Contractor Submissions. Samples shall be of such a nature to fully illustrate the character of the finished work or as may be more fully described in the trade Specifications.
B. Samples shall be furnished so as not to delay fabrication, allowing the A/E and RIOC/LiRo PM reasonable time for the consideration of the samples submitted.
C. The Contractor shall store and protect large samples and mock-ups until the Project is complete or until a time approved by the RIOC/LiRo PM.
D. Accepted samples will establish the standards by which the completed Work will be judged.

Samples:
A. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, range of color, finishes or texture and shall be properly identified.
B. Samples shall be checked by the Contractor for conformance to the Contract Documents before being submitted to the A/E and the RIOC/LiRo PM and shall bear the Contractor's stamp of approval certifying that they have been checked.
C. Samples shall be submitted in triplicate and each sample shall be identified with the name and number of the Project, reference to Specification Section, Contract Drawing number, nature of the material, trade name of manufacturer and the location of its intended placement. Written approval shall be obtained, and the work furnished shall conform strictly to the samples approved by the RIOC/LiRo PM. No approval of a sample shall be taken in itself to change or modify any of the requirements of the Contract.
D. Transportation charges or samples submitted to the RIOC/LiRo PM shall be prepaid by the Contractor. Samples shall be delivered to the RIOC/LiRo PM's field office. If the Contractor requires a sample for its use, it shall notify the RIOC/LiRo PM in writing.
E. If samples are disapproved, the Contractor shall make all corrections required and shall resubmit the required number of new samples until approval is received.

Job Mock-Ups:
Job mock-ups (as required) by the Architect or RIOC's representative shall be constructed on site by the Contractor and only one of each type will be required. Mock-ups shall be constructed only after the individual samples and components used in the mock-up have been approved by the A/E. If a mock-up is not approved, the Contractor shall construct additional ones until approval is received.

Samples for Tests:
The Contractor shall furnish such samples of material as may be required for examination and tests. All samples of material for tests shall be taken according to standard methods and as required by the Contract Drawings.

Samples of Materials:
The Contractor shall submit to the RIOC/LiRo PM for approval, samples of all materials, in accordance with the specification requirements, as directed by RIOC.
A. For samples of materials involving electrical work of any nature, see the "General Electrical

Requirements".

B. 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 and acceptable to the RIOC/LiRo PM.

C. 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 Drawing reference to the samples submitted.

D. A letter of transmittal, in triplicate, from the Contractor requesting approval, must accompany all such samples.

E. Transportation charges to the Construction Manager's office must be prepaid on all samples forwarded.

F. Samples for testing purposes shall be in accordance with the requirements of the Specifications.

Samples on Display:

When samples are specified to be equal to samples in the office of the RIOC/LiRo PM, they shall be carefully examined by the proposers and by those whom the proposer expects to employ for the furnishing of such materials.

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 RIOC/LiRo PM, 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 RIOC/LiRo PM for the Project.

The A/E will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.

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 location of the samples, their properties, etc.

Equivalent Quality of Materials:

All materials and equipment, which are designated in the Specifications by a number in the catalog 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 A/E, the equivalent to that specified, will be acceptable.

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, catalogs, 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.

Where the Specifications provide that the manufacturer's directions are to be used, such printed directions shall be submitted to the Construction Manager.

Construction Manager to Select Inspectors:
Except as specifically provided in the Specifications, the Construction Manager and A/E will select and designate all persons, firms, or corporations to make or witness each and every inspection, test or analysis, with or without reports. See also Technical Specifications for certain certifications and inspections; in all cases, the Technical Specifications supersede the General Conditions.

The Contractor shall give notice, in writing to the Construction Manager, sufficiently in advance of its intention to commence the manufacture or preparation of materials specially 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 RIOC/LiRo PM will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials, or it will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or it will notify the Contractor that inspection will be waived.

No Shipping Before Inspection - The Contractor shall comply with the foregoing, before shipping any material.

Certificate of Manufacture
When the RIOC/LiRo PM so requires, the Contractor shall furnish to him, 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 analysis where necessary, that have been made directly on the product or on similar products being fabricated by the manufacturer.

When materials or manufactured products shall comprise such quantity that it is not practical to make physical tests or chemical analysis directly on the product furnished, a certificate stating the results of such tests or analysis of similar materials which were concurrently produced may, at the discretion of the Construction Manager, be considered as the basis for the acceptance of such material or manufactured product.

Inspection and Testing

Testing laboratory services will be performed by a third-party contractor, except as required by the Technical Specifications.

Field Testing of Equipment:
A. General
1. All equipment shall be set, aligned, assembled and tested in conformance with the approved shop drawings, manufacturer's drawings and instructions, and as indicated in the Specifications.
2. This Contract requires that RIOC's Commissioning Consultant approves all testing of equipment. The Contractor is required to incorporate and conform to the Commissioning requirements.

B. Field Tests

1. Upon completion of the installation, request by Contractor to RIOC/LiRo PM for inspection and at a time approved by RIOC, equipment shall be tested by operating it as a unit with all related piping, electrical controls and mechanical operations.

2. All costs in connection with such tests, including all materials, equipment, instruments, labor, etc., shall be borne by the Contractor.

Certified Shop Test Reports:

A. Each item of equipment or material, for which pressure, head, capacity, rating, efficiency, performance, function or special requirements are specified or implied, shall be tested at the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and applicable test codes and standards.

B. When the Technical Specifications require witness shop tests at the point of manufacture or other approved facility, the only tests, which will be accepted, are those made in the presence of the RIOC or its representative. The Contractor shall give the RIOC/LiRo PM written notice thirty (30) consecutive calendar days in advance of the time when the equipment will be ready for the witness shop tests or for required inspections. This notification shall include a diagram of testing set-up and a list of instruments the manufacturer proposes to use for the tests. All instruments shall be of ranges suitable for the quantities to be measured, with approved laboratory calibration. Seven (7) copies of witness shop test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the RIOC/LiRo PM for approval.

1. All equipment and material to be witness shop tested shall be identified with serial numbers and/or approved permanent type identification marks.

2. The RIOC/LiRo PM shall be available on work days (Monday through Friday) to witness shop testing during normal business hours, which are defined herein as an eight-hour period between 7:30 a.m. and 4:00 p.m., with a one-hour break for lunch. In the event dangerous or hazardous conditions exist at the test facility or if adequate lighting has not been provided, the test will be terminated until the conditions are corrected. Witnesses shall be provided with protection from the elements and sanitary facilities, and drinking water shall be available for their use. Testing shall be conducted in the most expeditious manner and it is expected that each day's testing shall start as scheduled. Excessive or repetitious delays will be considered cause for the witnesses to terminate the test and reschedule the witnessing of the tests. All costs, including travel and subsistence expenses, incurred by the RIOC or its representative because of termination of the tests, will be back charged to the Contractor by deducting such costs from payment due for work completed.

C. When the Technical Specifications do not require witness shop tests of each equipment at the point of manufacture or other approved facility, or when witness shop tests specified in the Technical Specifications are waived by RIOC, seven (7) copies of the manufacturer's actual test data and the interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the RIOC/LiRo PM for approval.

D. In the event any equipment or material fails to meet the test requirements, the manufacturer shall make all necessary changes, adjustments and replacements and the tests shall be repeated, at no additional cost to RIOC, until the equipment or material test requirements are acceptable to the RIOC/LiRo PM and A/E.

E. No equipment or material shall be shipped to the Project until the A/E and RIOC/LiRo PM notify the Contractor, in writing, that the shop test reports are acceptable.

Inspection of Manufacturer's Facilities:
The Architect/Engineer and RIOC may inspect the manufacture or fabrication of any material or equipment that will be utilized in the Work. The Contractor shall advise the RIOC/LiRo PM on the state of the progress of the manufacture or fabrication of such material or equipment. Sufficient advance notice shall be given of various stages in the manufacturing or fabrication process, so that the Architect/Engineer and RIOC may schedule inspections of the facility engaged in the performance of the work.

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 analysis and/or test data and interpreted results thereof.

Reports. Six (6) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Construction Manager as prerequisite for the acceptance of any material or equipment.

Rejections. If making any test, it is ascertained by the Construction Manager that the material or equipment does not comply with the Specifications, the Contractor will be notified thereof, and it 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 RIOC.

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.

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.

The Contractor shall include in the Contract price all testing identified to be done by him, as per the Technical Specifications. The expense of the testing personnel, assigned by the RIOC/LiRo PM or RIOC, shall not be the Contractor's obligation. The Contractor shall reimburse RIOC 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.

Acceptance Tests

Governmental Agencies.
All equipment and appliances furnished and installations made under the Contract shall conform to the requirements of the Specifications and shall, in no event, be less than that necessary to comply with the minimum requirements of all governmental agencies having jurisdiction.

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.

Energy and Water for Tests.
The Contractor will furnish energy and water.

The Contractor shall furnish labor and all other materials and instruments necessary to conduct the acceptance tests at no additional cost to A/E and RIOC.

Certificates.
The Final Acceptance, by RIOC or A/E, shall be contingent upon the Contractor delivering to the Construction Manager all necessary certificates evidencing compliance in every respect with the requirements of the agencies having jurisdiction.

If the results of tests and controlled inspections indicate that the materials or procedures do not meet requirements as set forth on the Drawings or in the Specifications or are otherwise unsatisfactory, the Contractor shall only proceed as directed by the RIOC/LiRo PM. Additional costs resulting from retesting, re- inspecting, 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.

Certificates of Approval

The Contractor will be responsible for and shall obtain all final approvals for the Work installed under the Contract, in the form of such certificates that are required by all City Agencies having jurisdiction over the Work of the Contract.

All such certificates shall be forwarded to the RIOC/LiRo PM before Final Acceptance of the Work of the Contract.

Guarantees

Additional Guarantees.
In addition to the guarantee of the Work as stipulated in the "Agreement", the Contractor hereby guarantees the portions of the Work indicated by the Specifications, for the periods stated (listed in specifications); said periods to run concurrently with the above guarantee period.

The Contractor shall furnish surety company bonds when required by the Specifications, in the penal amounts indicated.
A. The surety shall be an approved company, duly authorized to do business in the State of New York. The bond shall be in such form as required by the Comptroller and the Commissioner.

The Contractor shall furnish written guarantees for such work as required by the Specifications, in the following form:

GUARANTEE

PROJECT:_____

CONTRACT NO. _____

SPECIFICATION SECTION NO. and TITLE: _____

GUARANTEE 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 (s) indicated above.

The Contractor also guarantees that it will promptly repair, restore, rebuild or replace, whichever may be deemed necessary by CM, any or all defective materials or workmanship of the aforementioned section that may appear within the guarantee period, and any finished work to which damage may occur because of such defects, to the satisfaction of CM, without any cost or expense to CM.

The Contractor hereby agrees to pay to the CM the cost of the repairs or replacements should the CM make the same because of failure of the Contractor to do so.

Contractor

By_____

Subscribed and swore to before me this

_____ day of_____, 20_____

Notary Public

Inspections by Other City Agencies

Just prior to Substantial Completion of this Project, the Contractor will file test, with the applicable city agencies, of Certificate of Compliance, as required by the Contract Documents, in the Department of Buildings, an application for a Certificate of Occupancy for the structure.

Construction Progress Schedule

This Section includes administrative and procedural requirements for the preparation, submittal, and maintenance of the progress schedule, reporting progress of the Work, and Contract Time adjustments, including the following:

1. Format.
2. Content.
3. Revisions to schedules.
4. Submittals.
5. Distribution.

Refer to the General Conditions and the Agreement for definitions and specific dates of Contract Time.

The above listed Project schedules shall be used for evaluating all issues related to time for this Contract. The Project schedules shall be updated in accordance with the requirements of this Section to reflect the actual progress of the Work and the Contractor's current plan for the timely completion of the Work. The Project schedules shall be used by the Owner and Contractor for the following purposes as well as any other purpose where the issue of time is relevant:

1. To communicate to the Owner the Contractor's current plan for carrying out the Work;
2. To identify work paths that is critical to the timely completion of the Work;
3. To identify upcoming activities on the Critical Path(s);
4. To evaluate the best course of action for mitigating the impact of unforeseen events;
5. As the basis for analyzing the time impact of changes in the Work;
6. As a reference in determining the cost associated with increases or decreases in the Work;
7. To identify when submittals will be submitted;
8. To prioritize the review of submittals;
9. To document the actual progress of the Work;
10. To evaluate resource requirements of the Contractor and the Owner;
11. To facilitate efforts to complete the Work in a timely manner.
12. To document the history of the Work.

Definitions:

A. Construction Schedule: A method of planning and scheduling a construction project utilizing a horizontal bar chart with a separate bar for each major portion of the Work or operation to make the schedule an effective tool for planning and monitoring the progress of the work.

B. Critical Path: The longest continuous chain of activities through the network at a given data date for the Schedule to a Contract Milestone or Contract Completion. Where the path to a specific Milestone has become negative, the Critical Path shall be the longest continuous chain of activities

with the greatest amount of negative float.

C. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
1. Critical activities are activities on the critical path.
2. Predecessor activity is an activity that must be completed before a given activity can be started.

D. Event: An event is the starting or ending point of an activity.

E. Milestone: A key or critical point in time for reference or measurement.

Quality Assurance:
A. Construction Scheduler:
1. Contractor is required to employ or retain the services of an individual skilled in construction scheduling ("Construction Scheduler"). The Construction Scheduler shall have at least five years of verifiable experience as the person primarily responsible for preparing and maintaining project schedules on projects of the same or similar size and nature as this project.
2. Should the Construction Scheduler leave the employ of the Contractor or be re- assigned from the project, the Contractor shall submit the qualifications of the proposed replacement Construction Scheduler within 7 days after the date the former Construction Scheduler's responsibilities end on this Project.

B. Scheduling Software:
1. The Contractor shall use the latest version of Microsoft Project as the scheduling software system for use on this Project.

Baseline Schedule:

Preliminary Gantt schedule is to be prepared by the General Contractor and submitted to the Engineer within seven (7) days of award of contract. This schedule is to cover all items of Work from the start of the project up to the completion. This schedule must be revised when the actual schedule of significant items varies more than one week from the proposed schedule.

Construction Schedule Format:
A. Program:
Use Microsoft Project, latest version.

B. Scale and Spacing:
Provide space for notations and revisions.

C. Sheet Size:
To be coordinated with Construction Administrator.

D. Weather Days Allowance:
The Contractor shall include as a separate identifiable activity on the Critical Path of the Construction Schedule, and activity labeled "Weather Days Allowance." Insert this activity immediately prior to the substantial completion milestone.

1. The minimum allowed duration of the Weather Days Allowance shall be calculated as follows (decimals rounded to nearest whole number):

Contract Time	Weather Day Allowance
(540 Calendar Days / 365) X 7 =	10 Calendar Days

2. The Contractor shall insert an activity in the Critical Path to reflect weather day occurrences when weather days are experienced. Identify this activity as a weather delay.
3. The Contractor shall reduce duration of Weather Days Allowance activity as weather delays are experienced and inserted into the schedule. Remaining weather days in Weather Day Allowance at completion of project is considered float. Weather delay, when justified, are considered allowable, non- compensable.

Content:
A. Show complete sequence of construction by activity, with dates beginning and completion of each element of construction.

B. Identify each item by specification section numbers.

C. Identify work of separate phases and other logically grouped activities.

D. Show accumulated percentages of completion of each item, and total percentage of Work completed, as of the first day of each month.

E. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Engineer.

F. Indicate delivery dates for Owner/Agency furnished products and any products identified as under Allowances.

G. Indicate critical path with original baseline indicated.

Submittals and Revisions to Schedules:
A. An initial bar graph schedule is to be prepared by the General Contractor and submitted.

B. Indicate progress of each activity to date of submittal, and projected completion date of each activity.

C. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

D. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

E. Schedules must be revised monthly and when the actual schedule of significant items varies more than seven (7) days from the proposed schedule.

F. Bi-Weekly schedules must also be prepared for review at progress meetings.

G. Submit revised Construction Schedules for each Application for Payment.

H. Submit four (4) copies of the Construction Schedule.

Distribution:
A. Distribute copies of the computer generated schedules to Engineer, Owner, Subcontractors, suppliers, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problem anticipated by projections indicated in schedules.

Delivery of Materials

The Contractor shall furnish to the Construction Manager a copy of each material order, indicating date of order and quantity of material, and shall also notify the Construction Manager when materials have been delivered to the Site and in what quantities.

Manufacturers' containers shall be delivered with unbroken seals and shall bear proper labels.

The Contractor Shall Coordinate Deliveries in order to avoid delay in, or impeding, the progress of the Work.

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.

Overloading. If authority is given to store materials in any part of the building area, they shall be so stored as to cause no overloading. The contractor is responsible for any structural damage caused by overloading.

No Interference. If it becomes necessary to remove and restock 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 Contractor shall remove and restock such materials at no additional cost to RIOC.

Protection Requirements

The Contractor shall be responsible for protection against vandalism, theft or malicious mischief of all of its work, materials and equipment at all times from the start to Final Acceptance of the Work.

Protection of Property:
A. The Contractor shall be responsible for the preservation and protection, on or adjacent to the Work Site, against damage or injury as a result of its operations under this Contract. Any damage or injury, occurring on account of any act, omission or neglect on the part of the Contractor, shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.

B. In the event of any claims for damage or alleged damage to property as a result of work under this Contract, the Contractor shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the Work Site, the Contractor, at its own expense, shall take such surveys, take photographs, or install inclinometers, as may be necessary to establish the existing condition of the property. Before Final Payment can be made, the Contractor shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.
C. The Contractor expressly undertakes to place upon the Work, or any part thereof, only such loads as are consistent with the safety of that portion of the Work.

Fire Protection:
A. The Contractor shall take all necessary precautions to prevent fires at or adjacent to the Work, buildings, etc., and shall provide adequate facilities for extinguishing fires which do occur. No burning of trash or debris will be permitted.
B. When fire or explosion hazards are created in the vicinity of the Work, as a result of the locations of fuel tanks or similar hazardous utilities or devices, the Contractor shall immediately alert the RIOC/LiRo PM of such hazards. The Contractor shall exercise all safety precautions and shall comply with all instructions issued by the RIOC/LiRo PM to prevent the occurrence of fire or explosion.

Chemicals: All chemicals used during Project construction or furnished for Project operation, whether herbicide, pesticide, disinfectant, polymer, or reactant of other classification, must show approval of the EPA and other recognized certifying Agencies. Use of all such chemicals and disposal of residues shall be in strict conformance with regulatory requirements. All liquids should be in the bottle they were sold in for identification purposes.

Explosives: Use of explosives is prohibited.

Contractor's Right to Act:
A. In case of an emergency, which threatens loss or injury of property and/or safety of life, the Contractor will be allowed to act, without previous instructions from the RIOC/LiRo PM, in a diligent manner. It shall notify the RIOC/LiRo PM immediately thereafter.
B. The amount of reimbursement claimed by the Contractor on account of any emergency action shall be determined in the manner provided in the "Agreement", "Contract Changes".

Access Roads and Parking Areas

Access Roads:
Access roads shall be in accordance with the Contract Documents. The access roads, used by the Contractor, shall be maintained by the Contractor at all times.

Maintenance of Traffic:
A. If the Contractor's operations cause traffic hazards, it shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety, satisfactory to the RIOC/LiRo PM. Repair work necessary after the Contractor's operations should be discussed in advance, when the damage can be anticipated.
B. Detours around construction will be subject to the approval of RIOC. Periods when traffic is

being detoured will be subject to the approval of RIOC.
C. Requests for road closings or detours shall be submitted to the RIOC/LiRo PM for approval a minimum of seven (7) days prior to the proposed closing or detour. Requests shall be accompanied by a schedule indicating the duration of closing or detour.

Parking Areas:
Parking of vehicles shall be in accordance with RIOC Requirements.

Restoration:
At the completion of the Work, the surfaces of land used for access roads and parking areas shall be restored by the General Construction Contractor, as per the requirements of the Contract Documents. In the absence of specific requirements, the General Construction Contractor shall restore the surfaces to their original condition.

Traffic Regulations
The Contractor shall obey all traffic laws and comply with all the requirements, rules and regulations of RIOC.

The Contractor's vehicles and mobile equipment shall adhere to the speed limits posted in the Project area. The General Construction Contractor shall post the necessary speed limit signs.

Barricades, Warning Signs, and Lights
The Contractor shall provide (for an extra fee), erect and maintain, as necessary for its work, strong and suitable barricades, danger signs and warning lights along all roads accessible to the public, as required by RIOC, to insure safety to the public. Sufficient barricades shall be erected and maintained to keep vehicles from being driven on or into work under construction.

The Contractor shall provide and maintain such other warning signs and barricades in other areas and around their respective work, as may be required for the safety of all those employed in the Work, operating personnel, or those visiting the Site.

Dust Control and Spillage
The Contractor shall take all necessary measures to control dust from its operations.

The Contractor shall remove all spillage of excavated materials, debris or dust from roads by methods as approved by the A/E and the RIOC/LiRo PM.

The General Construction Contractor shall sprinkle calcium chloride at locations and in such quantities and at such frequencies as may be required to control dust, as per regulatory agency standard.

Vermin Control
All piping, conduit, etc., passing through walls, floors, ceiling, and/or other solid construction, shall be sealed to prevent the passage of vermin. Seals shall be made by means of rock wool or other approved inert materials, packed sleeves or other approved construction.

Layout
The location of the Work is shown on the plans.
A. The Contractor for General Construction work shall lay out the proposed Work correctly and

shall be responsible for any damage caused RIOC, due to incorrect laying out of the Work.
B. The Contractor for General Construction work shall verify all grades, lines, levels and dimensions as shown on the Drawings and it shall report any errors or inconsistencies in them to the RIOC/LiRo PM before commencing work.
C. Existing or new control points, property markers and monuments that will be or are destroyed during the normal course of construction shall be reestablished by the General Construction Contractor and all reference ties recorded therefore shall be furnished to the RIOC/LiRo PM. All computations, necessary to establish the exact position of the Work, shall be made and preserved by the General Construction Contractor.
D. The RIOC/LiRo PM may check all or any portion of the Work and the Contractor shall afford all necessary assistance to the RIOC/LiRo PM in carrying out such checks. Any necessary corrections to the Work shall be immediately made by the General Construction Contractor. Such checking by the RIOC/LiRo PM shall not relieve the General Construction Contractor of any responsibilities for the accuracy or completeness of his work.

All Other Work:
A. The Contractor is responsible for layout of its work including, but not limited to, substructures, foundations, manholes, utility lines and equipment pads, based upon the reference lines and grades established herein.
B. The Contractor shall keep neat, legible notes of all measurements and calculations made by him, while surveying and laying out the Work.
C. Two copies of all notes and other records shall be furnished to the RIOC/LiRo PM monthly. Furnish complete notes upon Final Completion.

Cutting and Patching
The following is in addition to the requirements identified in the Technical Specifications:

Contractor Requirements:
A. Contractors shall perform all cutting and patching necessary for the Work of the Contract, in accordance with the requirements of the Drawings and Specifications. Work performed by another Contractor shall not be cut or altered without the approval of the Architect/Engineer and RIOC.
B. Before doing any cutting, the Contractor shall obtain the approval of the RIOC/LiRo PM as to the location, size, and method of making such openings.
C. All cutting and rough patching, as defined by the RIOC/LiRo PM, will be performed by the Contractor, unless otherwise specified in the Technical Specifications or shown on the Drawings. All finish patching shall be performed by the General Construction Contractor.
D. All cutting shall be performed in such a manner as to limit the extent of patching.
E. All patching shall be done in a manner to match the surrounding existing surfaces as closely as possible.
F. All painted surfaces, which are patched, shall have the patch painted to match the existing wall surfaces as closely as possible. The A/E shall be the sole judge of the color/texture match of the finish.
G. All holes cut through concrete walls or slabs shall be core drilled, unless otherwise specified or shown. No structural members shall be cut without approval of the RIOC/LiRo PM and Structural Engineer and all such cutting shall be done in a manner directed by them. No holes, except for small screws, may be drilled in beams or other structural members, without obtaining prior approval. All work shall be done in a neat manner by mechanics skilled in their trades and as approved.
H. The Contractor shall install sleeves, for their work, for all pipes and conduits passing through any wall or floor slab.

Errors and Omissions:
A. Details and procedures are as stipulated in Paragraph "A" of this Article. The Contractor responsible for errors or omissions will be responsible for all costs associated with cutting and patching.

Openings and Chases

The General Construction Contractor shall provide all openings and chases in its work, to fit its own work. All such openings or chases shown on the Contract Drawings, or reasonably implied thereby, or as consumed or modified by shop drawings approved by the A/E, shall be provided by the General Construction Contractor.

Where equipment frames or supports are to be installed as integral parts of an opening, the opening frames or supports shall be furnished and installed by the Contractor installing the equipment.

Any cost resulting from correction and defective, ill timed, or mislocated work, or for subsequent work, which becomes necessary because of omitted openings, chases, frames, etc., shall be borne by the Contractor responsible therefore, to this end, no Contractor shall arbitrarily cut, drill, alter, damage, or otherwise endanger the work of another Contractor. The nature and extent of any corrective or additional work shall be subject to the approval of the RIOC, following consultation with the Contractor involved.

Sleeves, Inserts and Wall Castings

The Contractor shall furnish and install in place, conduits, outlets, piping, sleeves, boxes, inserts, and other materials and equipment necessary to be built into the Work, as soon as the requirements of the Progress Schedule require them. The Contractor shall cooperate fully in connection with the performance of the above work, as cutting into new work is neither contemplated nor will it be tolerated.

In the event timely delivery of sleeves or other materials cannot be made, if approved by the RIOC/LiRo PM, and to avoid delay, the affected Contractor shall arrange to have boxes or forms set at locations where piping or other material is to pass through or in slabs, walls or other work. Upon subsequent installation of sleeves or other material, the General Construction Contractor shall fill around them with materials as required by the Contract. Necessary expenditure incurred for boxing out or filling shall be borne, without extra costs to RIOC, by the Contractor responsible therefore.

Scaffolding, Rigging and Hoisting

The Contractor shall furnish all adequately designed scaffolding, rigging, hoisting and services necessary for erection and delivery or removal of any equipment and apparatus under its Contract, up to 20 feet high, when the Trust's lift is not available or useable. The Contractor shall remove same from work involved when no longer required. The Contractor involved in this type of activity shall take all precautions to prevent accidents or damage to persons or property about the work involved and shall erect and maintain proper warning signs and guardrails, barricades, etc. In the event of the Contractor's negligence, it shall indemnify the RIOC/LiRo PM and RIOC against all claims, suits, damages and judgments, including counsel fees and disbursements incurred in the defense of any action to which it may be subjected by reason of such negligence.

Cleaning

Rubbish Removal and Cleaning: The General Construction Contractor shall remove from the Project and dispose of all debris and rubbish resulting from the Work, at least once a week and more often, if same interferes with the Work under the Contract, plant operations or presents a fire hazard. All debris and rubbish shall be removed from the property and legally disposed of. The Contractor shall be responsible for consolidating all debris and rubbish, resulting from its work, to one location in its work area. During course of demolition or new construction, the General Construction Contractor shall maintain, and keep free of debris or building material, required egress in accord with Fire Safety Regulations.

The Contractor shall sweep up and deposit at a location, designated by the RIOC/LiRo PM, all of its rubbish, debris and waste materials as it accumulates and when directed by the RIOC/LiRo PM.

The Contractor for General Construction work shall be responsible for the removal of all rubbish, etc., from the Site of the Project. It shall remove from the designated locations all piles of rubbish, debris and waste material as they accumulate and when directed by the RIOC/LiRo PM, and shall cart them away from the Site of the Project. It shall employ, and keep engaged for this purpose, an adequate force of laborers.

The Contractor shall remove from the Site all surplus materials when there is no further use for same.

At the conclusion of the Work, all erection, plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away by the Contractor.

RIC's Right to Clean: Should the Contractor fail, refuse or neglect to remove rubbish and waste materials and obligation to do so, the RIOC/LiRo PM shall remove and dispose of the said rubbish, waste materials and temporary work, clean the building and premises and deduct the cost thereof from any money due, or to become due, the Contractor under this Contract.

Piping and Equipment Identification

The Contractor shall furnish and install all components of the system for identification of piping and equipment, as specified. The system shall include the placing of identification signs, direction- of-flow arrows, identification tags, etc., on plant piping, equipment and structures. The General Construction Contractor shall paint the equipment and piping in the colors specified.

Operation and Maintenance Manuals

Contract requirements stipulate time limitations for submittal and approval of operation and maintenance manuals. See Division 1, Specific Requirements of the Technical Specifications, for specific requirements.

Progress Photographs

For the purposes of documenting work, when requested by LiRo, the Contractor shall utilize the services of a competent photographer, who shall take photographs showing the progress of the Work. The technician should be able to take these pictures, label them, store them, and email as needed.

Project Closeout

Specific Requirements and other provisions of the Technical Specifications stipulate requirements for

Project closeout. Items such as final cleaning, lubrication, survey, spare parts and special tools, equipment start-up services and other items specified are included. Final Payment will be contingent upon the Contractor complying with these requirements.

Logistics, and Vehicle Information

Roosevelt Island Operating Corporation Logistics

A. Oversized Deliveries & Vehicles - Any oversized deliveries or vehicles which do not meet the lift bridge height and weight restrictions must be brought to the Island via barge or other approved method at the cost to the contractor.

B. Visitors - Visitors are permitted to bring vehicles onto the Island ONLY upon formal request and clearance from RIOC/LiRo Point of Contact. Vehicle Access Request must be sent via email to Point of Contact no less than 24 hours prior to arriving. Request must include name of individual(s), name of company, purpose of visit, time of arrival and vehicle information (make, model, year, color and license plate number). Failure to provide this information 24 hours prior to the visit may result in denial of access to the Island. Upon request, all contractor /subcontractor employees must present identification to RIOC PSD.

C. Vehicles - There are limited provisions parking of personal or non-commercial vehicles on the island. Contractors on island for more than 3 months need to submit a Vehicle Permit Request. In the event that a vehicle pass has been misplaced a new pass will be issued at a cost to the subcontractor and the old pass' specific number will be null and void. If such null and void vehicle pass is found being used in addition to the two (2) passes, the Contractor's vehicle privileges will be revoked.

D. Vehicle Access - Contractors must submit a Vehicle Access Permit application for company vehicle access on the Island. Upon approval, a permit hang tag will be issued to the contractor. No company vehicles are allowed on the Island without prior permission from RIOC/LiRo.

E. Deliveries - Delivery of materials or equipment to the Island must be coordinated and approved by LiRo Point of Contact, via email. Notice must be provided no less than 24 hours prior to arriving. Notification must include name of individual(s), name of company, purpose of visit, time of arrival and vehicle information (make, model, year, color and license plate number). This information will be provided to RIOC PSD. Failure to provide this information 24 hours prior to the visit may result in denial of access to the Island. The contractor shall be responsible for all material deliveries to the Island. RIOC and LiRo are not responsible for any misplaced, lost or stolen property.

F. Island Speed Limits - The character of Roosevelt Island Operating Corporation is to be a pedestrian friendly place. All authorized vehicles must yield to pedestrians. The enforced safe driving speed limit on Roosevelt Island Operating Corporation is 15mph. Traffic rules must be followed.

G. Island Access/Egress Routes - Contractors must comply with RIOC PSD's direction when accessing and exiting the Island.

H. Emergencies - In the event of an emergency, use the attached Emergency Notification form to contact 911 and on RIOC PSD.

I. Additional Permits - In addition to the above, approval must also be requested for the following work and accommodations:

1. Tree Removal Permit - The Island's tree population is maintained under the joint oversight of state and city agencies. Accordingly, prior to the removal or alteration of any tree, a "Tree Removal Permit" must be completed by the contractor and approved by LiRo and RIOC.

2. Real Estate Request form - Prior to using space in any building or structure for the storage of equipment or materials, or as a temporary office, a "Real Estate Request form" must be completed by the contractor and approved by LiRo and RIOC.

3. Hot Work Permit - Prior to any hot work (i.e., riveting, welding, flame cutting or other fire or

spark producing operation), a “Hot Work Permit” must be completed by the contractor and approved by LiRo and RIOC.

4. Weekend Work form - Prior to scheduling weekend work, a “Weekend Work form” must be completed by the contractor and approved by LiRo and RIOC.