



Smithsonian Institution

Office of Planning, Design & Construction

SPECIFICATIONS

PROJECT NO.: 2200106

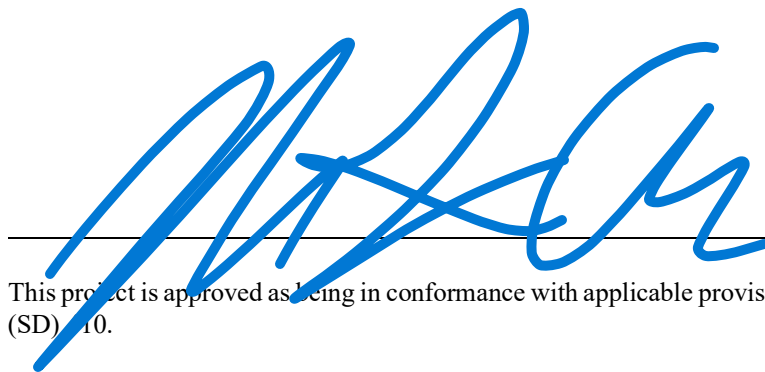
IDIQ CONTRACT NO.: 233330220DF0010307

PROJECT TITLE: NMNH Repair to the Main Building Exterior

FACILITY: Smithsonian National Museum of Natural History
10th & Constitution Ave, NW
Washington, DC 20560

100% SUBMISSION

DATE: December 18, 2024



02/26/25

This project is approved as being in conformance with applicable provisions of the Smithsonian Directive (SD) 10.

Michael J. Carrancho, P.E., Deputy Director

Date

PROJECT MANUAL

For

**Smithsonian
NMNH Repair to the
Main Building Exterior
Washington, DC**

Aeon Preservation Services, LLC

4703 Annapolis Road
Bladensburg, MD 21409

Consultants:

Architects

Legacy Architecture, LLC
114 North 2nd Street
Richmond, VA 23219

Quinn Evans
100 N Charles Street, 14th Floor
Baltimore, MD 21201

Structural Engineering

Matteo Ferran Structural Engineers
210 N Lee St, Suite 210
Alexandria, VA 22314

Waterproofing Engineering

Seal Engineering
3323 Duke Street
Alexandria, VA 22314

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NMNH Main Building Repairs

010000

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PROJECT SUMMARY AND INFORMATION

1. PROJECT INFORMATION

- 1.1. OPDC Project No. 2200106
Repair to Main Building East & West Exterior
National Museum of Natural History (NMNH)
10th St. & Constitution Ave. NW
Washington, DC 20560

- 1.2. Smithsonian Institution Contacts:
Contracting Officer (CO), address for Fed Ex and UPS delivery:
Smithsonian Institution
Office of Contracting & Personal Property Management
600 Maryland Ave. SW, Suite 500E
Washington, DC 20024

Contracting Officer (CO), address for USPS delivery:
Smithsonian Institution
Office of Contracting & Personal Property Management
600 Maryland Ave. SW, Suite 500E
Washington, DC 20024

Contracting Officer's Technical Representative (COTR), address for Fed Ex and UPS, delivery:
Smithsonian Institution
Attn: Sean Patterson
Office of Planning, Design & Construction
600 Maryland Avenue, SW
Suite 5001
Washington, DC 20024

Contracting Officer's Technical Representative (COTR), address for USPS delivery:
Smithsonian Institution
Attn: Sean Patterson
OPDC Capital Gallery
MRC 511
PO Box 37012
Washington, DC 20013-7012

2. SUMMARY OF WORK

2.1. The Contractor shall furnish all supervision, labor, materials and equipment needed for the cleaning, repair and repointing of stone masonry at the top floor level around the Smithsonian Institution's National Museum of Natural History located at 10th & Constitution Ave, NW , as set forth on the Drawings for OPDC Project No. 2200106, sheets I through 15 and in these specifications, both dated December 18, 2024 and to repair or replace and install blast protection of select exterior windows at the Smithsonian Institution's National Museum of Natural History (NMNH) located at 10th St. & Constitution Ave. NW, Washington, DC, as set forth on the Drawings for OPDC Project No. 2200107, sheets I through 27 and in these specifications, both dated December 5, 2024.

2.2. The Work includes, but is not limited to:

- Stone repointing
- Stone repair including mortar patches and dutchmen
- Stone crack repair
- Replacement of existing and installation of new lead T-caps
- General cleaning of stone, as well as specialty cleaning to remove biological and metallic staining
- Replacement of all sealants between stone masonry and windows
- Replacement of metal flashings
- Replacement of ferrous conduit with new non-ferrous conduit
- Protection of all adjacent surfaces, ground-level areas, roof areas etc as indicated
- Access as required to perform the work Abatement of hazardous materials including but not limited to asbestos (See H Drawing sheets)
- Demolition of select exterior windows
- Installation of new blast protection exterior windows at demolished openings
- Repair and installation of new blast protection features at select exterior windows

2.3. Critical Elements of the Work: The successful Contractor shall be fully qualified to install critical elements of the Work. Upon request of the Contracting Officer, bidders shall submit a statement of qualifications to address the following critical elements of the Work:

- Stone and masonry restoration, including the specific treatments indicated above
- Stone masonry restoration work on historic buildings listed on the National Register, or eligible for listing on the National Register, and under the oversight of preservation authorities
- Hazardous Materials Abatement. See H drawings.
- Selective Demolition
- Installation of blast protection windows and features
- Repair of historic exterior windows
- Coordination with occupied spaces, including security office, and construction of temporary protection

2.4. Delegated Design Elements of the Work: The Contractor shall furnish full engineering services on the following elements of the Work:

- 01 0000 – Scaffolding and Platforms
- 05 0400 – Miscellaneous Structural Steel
- 08 0151.91 – Steel Window Restoration – Blast Resistant
- 08 5113 – Aluminum Window Replacement – Blast Resistant
- 08 8000 - Glazing

3. **CONTRACT TIME FOR COMPLETION**

3.1. Work under this contract shall begin by the Contractor within ten (10) calendar days after the Notice to Proceed and shall be completed within the total contract time of 365 calendar days. All work, including project closeout activities, shall be completed in every respect within the contract time.

3.2. The start date and completion date shall be as stated in the Notice to Proceed issued by the Contracting Officer.

4. **SCHEDULE OF OPTIONS FOR BID**

4.1. The following is a brief statement of the Work identified for bid options. The complete description of the Work is identified elsewhere in the drawings and specifications.

BASE BID:

Cleaning, repair and repointing of stone masonry at the top floor level, north façade, around the Smithsonian Institution's National Museum of Natural History, Main Building. (OPDC Project No. 2200106, Sheet A223)

Repair and replacement of historic exterior windows with blast protection windows and features, including hazardous materials abatement, at the north façade of the Smithsonian Institution's National Museum of Natural History, Main Building. (OPDC Project No. 2200107)

BID OPTION 1: ADD

All work at East & West Additions (OPDC Project No. 2200106: Sheets A222, A224, & E102)

BID OPTION 2: ADD

All work at Rotunda Elevations and Dome Tension Ring (OPDC Project No. 2200106: Sheets A225 – A226)

NIC**BID OPTION 3: ADD**

Removal and replacement of plate glass and insulating glazing units (IGUs) at openings indicated as Bid Option 3, Scope B1 and B2 (OPDC Project No. 2200107: Sheets A-002G, A-401EL, A-402EL, A-403EL, A-601SH)

BID OPTION 4: ADD

Cleaning, repair and repointing of stone masonry at the top floor level, south façade, around the Smithsonian Institution's National Museum of Natural History, Main Building. (OPDC Project No. 2200106, Sheet A221)

NIC**5. SCHEDULE OF UNIT PRICES**

5.1. The unit prices in the following schedule shall be submitted as part of the bid. The Smithsonian reserves the right to accept or reject any or all unit prices.

5.2. The Contractor agrees that, in the event that the Contractor is directed by the Smithsonian to increase or decrease the quantities of work required by the contract documents on items listed below, the contract amount shall be adjusted based on the following unit prices.

5.3. Unit prices shall include the furnishing of all materials, labor, equipment and services necessary for or incidental to the execution of the work specified. Unit prices shall include all direct and indirect costs, overhead, taxes, insurance and profit.

5.4. These unit prices shall be binding upon the Contractor for the duration of the project. No escalation or other variation shall be allowed.

5.5. If requested by the Smithsonian, the Contractor shall provide material, equipment and personnel to verify or determine changes in quantities. Contractor measurements and calculations shall be subject to verification by the COTR.

5.6. Schedule of Required Unit Prices:

ITEM	Price (\$)	Per Unit
1. Stone Repointing		LF
2. Stone dutchman repairs (flat)		1/4 CF
3. Stone dutchman repairs (carved)		1/4 CF
4. Stone patching (flat or carved)		1/8 CF
5. Repair stone crack with injection grout		LF
6. Repair stone crack with patch		LF
7. Removal of biological growth		SF
8. Removal of deep metallic staining		SF
9. Removal of bitumen		LF
10. Lead T-cap installation		LF
11. Joint sealant installation		LF
12. Salvage and reset existing stone (carved)		CF
13. Remove and replace new stone (carved)		CF
14. Install new stainless steel pin or cramp		EA
15. Bird Guano Removal		LF
16. Remove and Replace Plate Glass		Per Lite
17. Remove and Replace Insulating Glazing Unit (IGU)		Per Lite
18. Exterior Wall Repair		LF
19. Remove and Replace sealant		LF

6. BIDDER EXAMINATION OF SITE

6.1. Every effort has been made to indicate all work necessary to complete the project as identified. All bidders shall carefully examine the premises during the bid period and satisfy themselves as to the extent, nature and location of the work, general and local conditions, particularly those bearing on transportation, disposal, handling and storage of materials, availability of labor, water, electric power, access routes, uncertainties of the weather, type of equipment and facilities needed for the successful execution of the Work.

6.2. Pre-Bid Conference and Site Visit. Before the bid opening date, a scheduled pre-bid/ conference and site visit will be announced by the Contracting Officer. The purpose of the scheduled meeting is to provide an opportunity for all bidders to review the project site. Any comments, information or discussion during the site visit shall not modify the contract documents.

6.3. This project requires special arrangements for access to a non-public area. Access to the site may be restricted at times other than during the scheduled visit.

7. AVAILABILITY OF DOCUMENTS

7.1. The successful Contractor will be supplied with electronic copies of all drawings and specifications after award of the contract, at no expense to the Contractor. Printing of the documents shall be at the expense of the contractor.

SPECIAL PROJECT REQUIREMENTS

8. UNITS OF MEASURE

8.1. All fabrication and installation shall be performed in accordance with the units of measure given in the Contract Documents.

8.2. All Contractor and subcontractor personnel working on the site shall possess and use metric measuring equipment for all work shown in metric units. Conversion of dimensions shown on contract drawings to English units for use of non-metric measuring equipment is prohibited.

9. NON-PUBLIC, TENANT AND SECURED SPACES

9.1. Certain tenant spaces, non-public spaces, utility and equipment rooms and other areas related to or used for purposes of storage, conservation, research, curation of museum collection and artifacts or for scientific research may have restricted access.

9.2. The Contractor shall identify to the COTR as soon as possible, but no less than two (2) working days in advance, any occupied areas that the Contractor must access that are located outside the limits of the project site. The Contractor shall identify in writing:

9.2.1. Restricted areas to be accessed.

9.2.2. Specific reason for needing access.

9.2.3. Nature of the work to be performed.

9.2.4. Date(s) and hours needed to complete construction work activity.

10. MUSEUM ARTIFACTS AND SCIENTIFIC RESEARCH MATERIALS

10.1. The handling of museum artifacts or scientific research experiments by the Contractor is strictly prohibited without written consent of the Smithsonian. The existing museum artifacts and research related materials may be moved only by authorized Smithsonian museum curatorial personnel. An offender of this clause may be subject to arrest or removal from the premises and project by Smithsonian security officers.

10.2. If temporary relocation of artifacts or research experiments is necessary, the Contractor shall give notice to the COTR at least five (5) working days in advance of the time relocation is needed.

10.3. Humidity/Temperature Controlled Spaces: The Contractor shall take care to minimize fluctuations in air conditions and quality, particularly in areas containing artifacts and storage collections and laboratories and scientific research experiments. Humidity and temperature-controlled areas require consistency of utility operation.

11. PROTECTION OF HISTORIC PROPERTIES

11.1. The project site is located in the National Museum of Natural History, which is a contributing element to the National Mall and listed on the National Register of Historic Places. Work in the National Museum of Natural History is subject to review under SD 418, Smithsonian Historic Preservation Policy, which follows the Secretary of the Interior's Guidelines for Treatment of Historic Properties. The project requires special attention to the quality of materials selected for installation and workmanship efforts to satisfactorily preserve and restore historic elements and finishes of an historic landmark structure.

11.2. Upon request of the COTR, the Contractor shall submit evidence of technical competence in restoration work for National Historic Landmark structures, including subcontractor resumes, references and photographs or previous similar work.

11.3. Without exception, all original building fabric of the National Museum of Natural History is designated historic.

12. COMMITMENT TO SUSTAINABILITY

12.1. The Smithsonian Institution is a trust instrumentality of the United States (recognized as a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code) and although not an Executive Branch of the U.S. Government, is committed to planning, designing, constructing, maintaining and operating its owned and leased buildings and facilities consistent with Federal environmental and energy management requirements, as listed in the Smithsonian OFEO Codes, Standards and Guidelines document, dated October 2021, to the maximum extent practical.

12.2. Refer to MasterSpec (AIA) Division 01 sections following this section 010000 on Sustainable Design Requirements - Construction Waste Management and Disposal and other related sections, as required.

13. COMMISSIONING

NOT USED

CONTRACTOR USE OF PREMISES

14. HOURS OF WORK, WORKDAYS AND GOVERNMENT HOLIDAYS

14.1. Work shall be performed, under this contract, during the normal workdays of Monday through Friday, except Smithsonian holidays as specified herein and the normal work hours of 6:00 AM to 3:30 PM except as identified on the Construction Phase Plan or specified below and as coordinated with the COTR:

- a. Work above the main entrance on Constitution Ave. (Facets N, O, & P) shall be executed after Museum closing.
- b. No work shall occur in visitor areas (Facets N, O, & P) between April and August 2026 due to the Semi-Quincentennial Celebration.
- c. Haul route for removal of demolition, work in corridors, lobbies and spaces accessible to museum staff shall be accomplished between start of off-hours and 6:00 am Monday through Friday and on weekends.
- d. Welding and cutting by acetylene torch shall be accomplished during the week between start of off-hours and 6:00 am Monday through Friday.
- e. Painting and work creating objectionable odors shall be accomplished during the week between start of off-hours and 6:00 am Monday through Friday and on weekends. Precautions shall be taken to minimize objectionable odors.
- f. Work creating sounds or vibrations shall be accomplished during the week between start of off-hours and 6:00 am Monday through Friday and on weekends. Precautions shall be taken to minimize sounds and vibrations to the greatest extent possible.
- g. Removal of asbestos, lead-based paint and other hazardous materials shall be accomplished between start of off-hours to 6:00 am Monday through Friday and on weekends.
- h. Removal of demolition and construction debris through public spaces shall be accomplished between start of off-hours and 9:30am Monday through Friday and on weekends.
- i. Deliveries through public spaces shall be accomplished between start of off-hours and 9:30 am Monday through Fridays.
- j. All work must be coordinated so as not to interfere with the Museum's Special Events Schedule and spring and summer month schedule. Normal museum off-hour and non-Special Event times are typically start of off-hours to 6:00 am, but may vary per special event.
- k. All drilling, hammer-drilling, and similar work activities that create excessive noise shall be conducted off-hours and shall terminate no later than 6:00 am.

14.2. Museum exhibit areas are normally open to the public seven days a week, from 10:00 am to 5:30 pm. These hours may be extended during the spring and summer months and at other times.

- a. "Off hours" shall be defined as those hours when the museum is not open to the public, off-hours normally begin at 6:30 pm, except during spring and summer months when off hours begin at 8:00 PM.
- b. "Week end" shall be defined as those hours between 6:30 pm on Friday until 6:00 am Monday.

14.3. For each occasion the Contractor intends to work on Saturdays, Sundays or Smithsonian holidays or during hours other than those indicated above, the Contractor shall obtain written permission from the COTR, at least three (3) working days in advance.

14.4. The Contractor shall reimburse the Smithsonian Institution for security and inspection services provided by the Smithsonian when the Contractor chooses to work outside the normal workdays and hours, as identified herein. However, the Contractor will not be charged for SI overtime security and inspection services, if in the opinion of the COTR, the work cannot be done during the normal workdays and hours due to requirements of the Smithsonian.

- a. Access to all spaces and escort availability must be coordinated through the COTR. This requirement will be strictly enforced throughout the duration of the project.
- b. The Smithsonian makes no guarantees for the availability of additional escorts. However, the Contractor will not be charged for SI overtime security and inspection services, if in the opinion of the COTR, the work cannot be done during the normal workdays and hours due to requirements of the Smithsonian.

14.5. Smithsonian Holidays: For holidays that fall on Saturday, the Smithsonian Holiday is observed on the previous Friday. For holidays that fall on Sunday, the Smithsonian holiday is observed on the following Monday. The Smithsonian Holidays are listed below.

New Year's Day	January 1
Martin Luther King Jr.'s Birthday	January, third Monday
George Washington's Birthday	February, third Monday
Memorial Day	May, last Monday
Juneteenth	June 19
Independence Day	July 4
Labor Day	September, first Monday
Columbus Day	October, second Monday
Veterans' Day	November 11
Thanksgiving Day	November, fourth Thursday
Christmas Day	December 25
President's Inauguration Day	January 20, 2025

14.6 Special Events: All work must be coordinated so as not to interfere with the Museum's Special Events Schedule. Special Events are primarily held in the evening after the museum is closed to the public and, therefore, have an impact on the night work schedule. There are approximately 180 Special Events held in the evening per year, and they may delay work start time from anywhere between 9:00pm to 12:00am/midnight. The periods of February through July, and September through December, are typically the most intense for Special Events. Some Special Events will preclude any construction work at all for the evening of the event. Coordination through COTR is required.

14.7 The Smithsonian Institution reserves the right to occupy or install equipment in completed areas of the building prior to substantial completion provided that such

occupancy does not interfere with the completion of the work. Such partial occupancy shall not constitute acceptance of any part of the work.

15. CONDITIONS AFFECTING CONTRACTOR'S WORK

15.1. Existing Occupied Spaces: The premises will be occupied during the performance of the Work under this contract. The Contractor shall schedule work activities to minimize interruption of occupants and occupied spaces. The Contractor may work in interior or roof-level areas only in the presence of authorized Smithsonian staff or guard personnel. Areas that will remain occupied include all public building areas, all offices, all service areas, loading docks and playground areas. The Contractor shall take into consideration that adjacent areas will be occupied during the project. The project shall not adversely impact means of egress from adjacent areas. If egress will be impacted, a plan must be developed and submitted electronically in PDF format to SI (COTR and Building Manager) conveying how egress shall be handled through the various phases during the course of the project. Protective measures include, but are not limited to, constructing protected, fire-rated egress routes and/or tunnels, and defined egress paths.

- a. Conduct a site walk prior to commencement of the work with SI and NMNH personnel through occupied spaces.
- b. All material must be on-site prior to demolition.
- c. Do not remove existing windows that can not be replaced within the same day. All removed existing windows must be replaced the same day.
- d. Provide temporary barriers between the work and any occupied space.
- e. Security Office:
 - a. Only one window may be removed at a time at the Security Office.
 - b. Temporary barriers built in the security office shall leave network access points adjacent to windows accessible.
 - c. Provide Security Office a schedule detailing timeframe for work within the office at least 2 weeks prior to work in this space.
- f. A plan shall be developed and submitted electronically in PDF format to SI (COTR and building Manager), prior to the start of construction activities, that describes the order and sequence of the removal and installation of the windows and temporary protection measures.

15.2. Relocation of Existing Occupants: Contractor's requests for the Smithsonian to temporarily relocate existing occupants or for Contractor's access to secured areas shall be made to the COTR as far in advance as possible, but no less than 20 working days in advance of the need for relocation.

15.3. Space for Contractor Use: The space available for Contractor's use is limited to areas indicated on the Contract Drawings as the project site. Do not disturb or enter portions of Project site beyond areas in which the Work is indicated. Space allocation and availability are subject to change, at the discretion of the Smithsonian, to meet the needs of all parties requiring access and space within the building and the surrounding areas.

- a. Owner Occupancy: Allow for COTR occupancy of Project site.

- b. Driveways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

15.4 Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

15.5 Coordination of Construction Staging: This project includes equipment replacement, upgrades, and new installation in distributed electrical, back of house, and public spaces throughout the building. All surrounding areas of the building will be maintained occupied and operational through the extent of construction and will require phased construction and after hours coordinated electrical shut-downs. Contractor shall also coordinate with NMNH at the beginning of the project to review other potential areas which may be under construction or renovation at the time of construction. Further coordination of work space, outages, etc. may be required between contractors.

15.6 Confined Space: Work in permit-required confined space (PRCS) must comply with OSHA standard 29 Code of Federal Regulations (CFR) 1910.146 "Permit-Required Confined Spaces" as outlined in The Smithsonian Institution Safety Manual. The Contractor shall meet all required criteria and follow all procedures described in The Smithsonian Institution Safety Manual.

- a. A minimum of (3) certified confined space personnel are required for all confined space entries at NMNH: At a minimum, an entry supervisor, attendant and entrant. Note that this is above and beyond the OSHA Requirement of (2).
- b. Work related to the emergency feeder installation between the Chiller Plant & West Court Basement electrical room occurs within the Main Building tunnels, which are classified as PRCS.

16. CONTRACTOR DELIVERIES, HAULING AND ACCESS

16.1. The Contractor's materials and equipment shall be delivered, received and handled by the Contractor's personnel.

16.2. Normal deliveries shall be made along routes from the East and West Loading Dock. Schedule all deliveries with COTR and NMNH a minimum of 48 hours in advance. When deliveries must travel inside the building through visitor/public space areas or exhibit areas, these deliveries shall be restricted to the hours specified above, unless special permission is obtained from the COTR 72 hours in advance of each delivery.

16.3. The Contractor personnel entrance into the building is restricted to the West Loading Dock or designated entrance for employee/service personnel.

16.4. The Contractor may use the freight elevator located at the East and West Loading Dock for movement of material, structures and equipment within acceptable loading limits.

16.5. The transportation of hazardous materials or hazardous waste into or out of the building shall be limited to the following routes and freight elevators: East Loading Dock. All hazardous materials shall be transported through the building in secondary containment and properly secured to transport carts to prevent breakage or spills. Further direction on the transportation of asbestos containing or lead containing waste materials is provided in Specification Sections 02 8200 and 02 8300 respectively.

- a. All hazardous materials removed from the premises are to be signed off by the NHB Safety Manager.

16.6. Contractor personnel access and hauling of materials to work areas in the existing building will require a Smithsonian security escort. Access routes shall be as designated by the COTR.

16.7. Contractor may not block access to loading dock indicated for Contractor use in staging area. Loading dock shall remain in operation for Smithsonian use.

16.8. Internal combustion engines (including propane-fueled "Georgia buggies") will not be permitted in the Museum.

16.9. Provide protection for flooring along delivery routes, so that flooring is not damaged. Install and remove such protection only during delivery hours specified above, so that the affected areas can be open to the public the following morning. The Contractor is responsible for repairing any damage along delivery routes caused by delivery activities, including but not limited to damage to floors, walls, and ceilings.

16.10. Vehicles in excess of 72,000 lbs. or 32,000 lbs/axle are not permitted in the east loading dock/parking lot.

16.11. Tractor-Trailer deliveries shall be coordinated with COTR. 72 hours advance notice is required. Only vehicles meeting east loading dock/parking lot weight restrictions are permitted.

17. DRESS AND DEPORTMENT

17.1. Contractors' personnel shall be fully and appropriately clothed at all times and shall conduct themselves in a manner appropriate to a public place. The COTR may require removal of any individual from the premises and project for unacceptable dress, demeanor or disruptive conduct, if the Contractor superintendent fails to correct conditions in violation of this paragraph.

18. CONTRACTOR PARKING

18.1. One parking space will be assigned to the Contractor for use during the contract period. The Contractor should contact the COTR to make arrangements to obtain an SI parking permit at least seven (7) working days before the start of any work on the site.

18.2. SI parking and delivery permits at NMNH are extremely limited and availability may be impacted by events or other project activities. Contractor must provide driver's name and vehicle make/model/license plate.

18.3. The assigned space can only be used by the company vehicle. The vehicle must be clearly marked with company name and/or logo. The permit shall be displayed on the vehicle dashboard on the driver's side. Vehicles not in compliance with this clause are subject to ticketing and towing. Costs associated with parking violations shall be the sole responsibility of the Contractor.

18.2. Arrangements for additional Contractor parking are the sole responsibility of the Contractor. Parking may not be available at the project site.

19. EATING, DRINKING, SMOKING AND ILLEGAL SUBSTANCE ABUSE

19.1. Eating and drinking in Smithsonian buildings or leased space will be allowed only in designated areas. Offenders may be subject to removal from the premises and project should the Contractor's Superintendent fail to correct conditions, which, in the opinion of the COTR, violate this clause.

19.2. The consumption of alcoholic beverages by the Contractor's personnel is prohibited in all Smithsonian buildings or leased space.

19.3. Smoking or carrying lighted tobacco products is prohibited in all Smithsonian buildings or leased space, in exhibition and public spaces, in areas where hazardous materials are stored or handled and in areas undergoing construction, renovation or repair. Acceptable areas for smoking are outside of the building at least 25 feet from any opening, operable window or air intake vent and as designated by the Smithsonian Building Manager.

19.4. The possession, sale and/or use of narcotics or other illegal substances or firearms by Contractor employees are strictly prohibited in all Smithsonian facilities and leased space. Contractor employees are strictly prohibited from working on the project under the influence of alcohol and/or illegal substances. Contractor employees in violation of any of the above prohibitions will be removed from the project.

PROJECT COORDINATION

20. COORDINATION OF TRADES

20.1. The Contractor shall coordinate work of different trades so that interference between mechanical, electrical, architectural and structural work, including existing services, shall be avoided.

20.2. Not Used.

20.3 Where work by separate entities requires off-site fabrication of products and accurate interfacing of materials to produce the required results, the Contractor shall prepare coordination drawings to indicate how work shown on separate shop drawings will be interfaced, intermeshed and sequenced for installation. Coordination drawings shall be submitted in accordance with the requirements of the "Submissions" section.

20.3.1. Work installed prior to approval of coordination drawings shall be at the Contractor's risk. Subsequent relocations required to avoid interferences shall be made without additional expense to the Smithsonian. If an interference develops, the COTR will decide which work shall be relocated, regardless of which was installed first.

20.4. Installation of equipment and systems shall allow the maximum practical space for operation, repair, removal and testing, within the limits indicated on the Contract Documents. Pipes, conduit, ducts and other system components shall be installed as close as possible to ceiling slabs, walls and columns to minimize space used while accommodating function and maintenance.

21. QUALITY CONTROL

21.1. The Contractor shall provide for quality control, inspections, testing and re-testing as necessary for all work, including that of Subcontractors, to assure compliance with the contract documents.

21.2. Contractor Quality Control (CQC) System: The Contractor shall provide a quality control organization and system to perform quality control, inspections, testing and re-testing as necessary for any item of work, including that of Subcontractors, to assure compliance with the contract documents.

21.3. CQC Representative Designation and Authority: The Contractor shall provide a CQC Representative, supplemented as necessary by additional personnel, who shall be on the jobsite at all times during progress, with complete authority to take any action necessary to ensure compliance with the contract documents. The CQC Representative shall be appointed by a letter addressed to him/her and signed by an officer of the firm and shall not be the same individual as, or be subordinate to, the job superintendent or project manager.

21.4. CQC Plan Requirements: The Contractor shall submit for review/approval a CQC Plan within thirty (30) calendar days after Contract Award to the COTR for approval. The Plan shall detail the procedures, instruction and reports to be used to assure compliance with the contract documents. As a minimum, the Plan shall include the following:

21.4.1. Designation of the CQC Representative: Identify the person and list duties, responsibilities and authority.

21.4.2. Organization Chart: Show CQC staff and its relationship with other staff members and Subcontractors.

21.4.3. Personnel Matrix: For each specification section, identify who is the authorized submittal reviewer, who will inspect the work, what testing laboratory or person will perform on-site testing, who will perform factory inspections and testing and who will certify the documentation.

21.4.4. Responsibility and Authority: State the responsibility and authority for each individual in the CQC system.

21.4.5. Personnel Qualifications: Provide resumes and descriptions of prior experience on similar work.

21.4.6. Inspection Procedures and Schedule: Identify the inspection and testing procedures and scheduled dates as reflected on the CPM project schedule, organized by technical specification section.

21.4.7. Submittal Review Procedures and Schedule: Provide submittal log in accordance with the Submissions section. For each specification section, identify the name(s) of person(s) authorized to review and sign submittals for compliance.

21.4.8. CQC Documentation: Identify the procedures for documenting quality control operations, inspection and testing. Provide samples of each type of required documentation - all forms, logs, reports, etc. Include a testing log listing all tests and inspections required by the contract documents and stating the action to be taken by the Contractor and/or the Smithsonian.

21.5. CQC Staffing Requirements: The following listing of minimum staff requirements in no way relieves the Contractor of meeting the basic requirements of the Contractor Quality Control System for this project. The Contractor shall ensure an adequate staff to meet the CQC requirements at all times during construction. When necessary for a proper CQC organization, the Contractor shall provide additional staff at no cost to the Smithsonian.

21.5.1. CQC Representative: The CQC Representative shall be a graduate engineer or architect with a minimum of seven (7) years of construction experience on projects similar to this one, including three (3) years experience in Quality Control.

21.5.2. Alternate CQC Representative: The Contractor shall designate an alternate person to act for the CQC Representative in case the CQC Representative is absent from the construction site. The alternate may not act for the CQC Representative for a period longer than fourteen (14) consecutive calendar days without written approval by the COTR.

21.5.3. CQC Submittals Assistant: The Contractor shall assign an assistant, to work until submittals are 95% complete, whose sole duty shall be to assist the CQC Representative in maintaining files and logs for submittals.

21.5.4. CQC Specialized Supplemental Personnel:The Contractor shall provide, as a minimum, a different person in each of the areas listed below to assist and report to the CQC Representative. Supplemental personnel shall be responsible for ensuring that the construction complies with the contract documents in their areas of responsibility. They shall be on the jobsite during all installation and testing in their areas of responsibility and shall be responsible for performing inspections and witnessing testing as required by the contract documents.

- Foreman, Masonry Restoration
- Foreman, Roofing & Flashings
- Historic Preservation Specialist
- Blast Protection Specialist

21.6. CQC Inspection Requirements:As a minimum, the inspection procedures shall include the following:

21.6.1. Preparatory Inspection: Preparatory inspection shall be performed before beginning work and before beginning each segment of work. Preparatory inspection shall include a review of the contract requirements, complete review of shop drawings and other submittals for conformance with contract documents, confirmation that all required testing will be provided, physical examination of all materials and equipment for conformance with approved shop drawings and submittals and verification that all required preliminary work has been completed.

21.6.2. Initial Inspection:Initial inspection shall be performed as soon as a representative segment of the particular item of work has been accomplished. Initial inspection shall include checking of all dimensions, careful inspection of workmanship, performance of required testing, performance of corrective actions as necessary and approval or rejection of the initial segment of the work.

21.6.3. Follow-up Inspections:Follow-up inspections shall be performed daily or more frequently, as necessary, and shall include continued testing and examinations to assure continued compliance with the contract requirements.

21.6.4. Special Inspection and Documentation:In addition to the above inspection requirements, certain Special Inspection and Documentation requirements may be contained within the technical specification sections. Each Special Inspection shall be performed and documented as required and documentation shall be submitted as soon as possible after performance unless otherwise indicated.

21.6.5. Factory Inspection by the Contractor: The Contractor shall arrange and perform all factory inspections specifically required in the technical specifications sections.

21.6.6. Non-Compliance Check-Off List: The CQC Representative shall maintain a check-off list of work that does not comply with the contract, stating specifically what is non-complying, the date the faulty work was originally discovered and the date the work was corrected. The CQC Representative shall not allow the Contractor to add to or build upon non-complying work unless, in the opinion of the COTR, correction can be made without disturbing the continuing work. The CQC Representative shall submit a copy of the check-off list to the COTR on a monthly basis. Items corrected on the day they are discovered do not need to be included on the submitted list.

21.6.7. Completion and Inspection of Work: The CQC Representative shall sign the written request for Substantial Completion Inspection (discussed in the Project Closeout Requirements section).

21.7. Testing Requirements: Except as specifically stated otherwise, the Contractor shall be responsible for all field sampling and in-place testing required by the contract documents.

21.7.1. Independent Testing Laboratory: The Contractor shall provide an independent, commercial testing laboratory to perform all sampling and testing services required, unless otherwise specified. The testing services shall be on- or off-site as required. Submit complete documentation of all tests performed in connection with the construction contract.

21.7.2. Smithsonian Acceptance of Laboratories: Except for factory tests, all field sampling and testing normally performed by commercial laboratories shall be performed by an independent commercial laboratory employed by the Contractor and accepted by the COTR. The Contractor shall submit the following information to the COTR for approval:

21.7.2.1. Name, registration number and engineering discipline of the Registered Professional Engineer in charge of the laboratory.

21.7.2.2. Affidavit of compliance and certification that the laboratory performs work in accordance with requirements as stated in the contract documents.

21.7.2.3. A list of testing equipment proposed for each test procedure including latest calibration data.

21.7.2.4. A copy of the latest Laboratory Inspection Report by an independent agency with laboratory certification that deficiencies (if any) have been corrected.

21.7.2.5. Names and qualifications of persons actually performing testing and sampling. Changes in personnel shall be approved by the COTR prior to performance of work under this contract.

21.7.3. Factory Tests: Unless otherwise specified, the Contractor shall arrange for factory tests when they are required under the Contract. Certified copies of test reports showing that the materials to be incorporated into the work conform to the contract documents will be acceptable, provided they are performed by the manufacturer or by agencies or laboratories acceptable to the COTR.

21.7.4. Test Results: Test results shall cite the contract requirements, the test or analytical procedures used, the actual results and include a statement that the item tested or analyzed conforms or fails to conform to specification requirements. The cover sheet for each report shall be conspicuously stamped in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, as the case may be. All test reports shall be signed by a testing laboratory representative authorized to sign certified test reports. The Contractor shall arrange for immediate and direct delivery of the signed reports, certifications and other documentation to the COTR.

21.8. Documentation: The CQC shall prepare or assist with the preparation of the following documents:

21.8.1. Daily Reports: The Contractor's Daily Report, as discussed in the section Contractor Correspondence and Daily Reports, shall be signed by the CQC Representative as well as the Superintendent. The CQC Representative's signature certifies that, to the best of his or her knowledge, the report is complete and correct and that all materials, equipment and work described on the report are in compliance with the contract plans and specifications, except as noted otherwise.

21.8.2. Special Inspection and Documentation: Reports of Special Inspections shall be signed by both the CQC Representative and the CQC Specialized Supplemental Person who witnessed the test or inspection certifying compliance with the specific contract requirement.

21.8.3. As-Builts: The CQC Representative shall ensure that all requirements for as-built record drawings and specifications are met. The CQC Representative or Specialized Supplemental Personnel assigned to inspect that particular portion of work shall initial each as-built drawing or technical specification section to certify its accuracy prior to submission in accordance with the Project Close-Out Requirements section.

22. PERMITS, LICENSES& FEES

22.1. The Contractor shall obtain and pay for all applicable permits and licenses required by regulating agencies, including but not limited to: permits for pedestrian and road markings, construction fences, sidewalk cuts, utility company connections, elevator certificates, waste containers, etc.

22.2. The Contractor shall pay all duties, fees, taxes and other charges and give all notices necessary and incidental to the due and lawful execution of the work.

22.3. The Contractor shall keep the Smithsonian indemnified against all penalties and liability for breach of provisions of any national, provincial, district or city statute, ordinance or law and the regulations and by-laws of any local or other duly constituted authority, which may be applicable to the Work and with such rules and regulations of public bodies and companies.

22.4. Accessibility for Physically-Disabled Persons: The Contractor's shall provide temporary constructions at the site as necessary to maintain access for physically disabled persons. All provisions for temporary access shall be subject to the approval of the COTR.

23. UTILITY SERVICE INTERRUPTIONS AND NEW CONNECTIONS

23.1. Any planned interruption in utility service must be approved by and coordinated through the COTR. The Contractor shall submit a written request as far in advance of scheduled interruption as possible, but no less than two (2) full working days in advance. The Contractor shall make the necessary temporary provisions to supply continuous electrical power, HVAC space conditioning and security as required during periods when service is interrupted.

23.2. The Contractor's work efforts to restore service shall be continuous until the interrupted utility is back in service.

23.3. The electrical power for the National Museum of Natural History may not be interrupted between the hours of 7:00am and 7:00pm.

23.4. A fire watch shall be provided for the time periods when fire suppression and detection systems are out of service.

23.5. Existing electrical outlets and water connections are noted on Sheet G002 (OPDC Project No. 2200106).

23.6. Temporary electrical service connections may be required to operate contactor's hoists and power tools. Contactor shall provide an electrician at no additional cost to the Smithsonian to assess the adequacy of existing service and power needs and to make necessary temporary power connections and provisions.

23.6.1 Contractor's electrician shall work closely with NMNH Building facilities personnel to identify potential areas to connect to building's existing electrical service panels.

23.6.2. Any service interruptions required to connect to existing service panels will need to be closely coordinated with building facilities personnel and will need to be done outside normal working hours.

23.6.3 The Smithsonian Institution does not warrant that existing electrical service will be adequate for loads imposed by Contractor's equipment.

23.6.4. If existing connections and service prove to be inadequate, Contractor will need to provide inverter type generators to run equipment as needed.

23.7 Use of existing water connections shall be closely coordinated with building facilities personnel.

23.7.1. Exterior water connections are typically shut off during winter months.

23.7.2. Short-term connections to existing lawn irrigation system on the Constitution Ave side are possible but must be closely coordinated with Smithsonian Horticultural personnel and require a special fitting attachment.

23.7.3. The Contractor shall submit a written request as far in advance of scheduled water needs as possible, but no less than two (2) full weeks in advance.

23.7.4. Hoses running along the ground must be covered with hose protector ramps in areas of likely pedestrian or vehicular traffic.

24. SMITHSONIAN-FURNISHED ITEMS INSTALLED BY THE CONTRACTOR

NOT USED

25. SALVAGE

25.1. The Smithsonian Institution assumes no responsibility for salvage value or any loss or damage to materials or structures on the site for which the Contractor may have reflected a salvage value in his or her bid.

25.2. Except as specifically stated in the contract documents, construction materials, equipment or other items that are to be removed and neither re-used under this contract nor reserved as property of the Smithsonian Institution shall become the property of the Contractor and shall be removed from the premises by the Contractor.

25.3. The following items shall remain the property of the Smithsonian and the Contractor shall deliver the items to the locations specified or as otherwise directed by the COTR, at no additional cost to the Smithsonian.

ITEM	DELIVERY LOCATION
1. Security Cameras	

26. CUTTING, PATCHING AND MATCHING EXISTING WORK

26.1. Existing work shall be cut, drilled, altered, removed or temporarily removed and replaced as necessary for performance of work under the contract. Work that is replaced shall match similar existing work. Structural members shall not be cut or altered, except where noted on drawings, without authorization of the COTR. Work to remain in place, which is damaged or defaced during this contract shall be restored to match the conditions existing at the time of award of the contract, at no additional cost to the Smithsonian.

26.2. Conditions exposed by removal of existing work that do not match new finishes or align with new work shall be called to the COTR's immediate attention. Necessary corrective work directed by the COTR will be subject to adjustment provisions as stated in the General Conditions of the contract.

PROTECTION OF THE SITE DURING CONSTRUCTION

27. PROTECTION OF THE SITE

27.1. The Contractor shall provide adequate protection for all parts of the building, including interior and exterior surfaces, its occupants and contents and grounds wherever work under this contract is performed.

27.2. Plan for Protection of the Site: The Contractor shall submit a plan for protection of the site to the COTR for approval. As a minimum, the Plan shall describe:

- 27.2.1. Proposed method, location and construction of temporary enclosures.
- 27.2.2. Routes of access and egress, including those for people with disabilities.
- 27.2.3. Location and maintenance of emergency exits.
- 27.2.4. Methods of protection of existing surfaces and occupants.
- 27.2.5. Means of connection of temporary enclosures/surfaces to existing historic materials.

27.3. Erosion and Sedimentation Control (ESC) Plan: If the work under this contract involves disturbance of the site grounds, the Contractor shall prepare an Erosion and Sedimentation Control (ESC) Plan conforming to the erosion and sedimentation requirements of the most recent version of the EPA Construction General Permit OR local

erosion and sedimentation control standards and codes, whichever is more stringent, and shall submit the Plan to the COTR prior to the start of construction for approval. The Plan shall describe the measures implemented to accomplish the following:

27.3.1. Prevention of loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.

27.3.2. Prevention of sedimentation of storm sewers and receiving streams.

27.3.3. Prevention of air pollution from dust and particulate matter.

27.4. During construction, temporary enclosures shall be constructed to prevent unauthorized access or egress. Dust and fume barriers shall be constructed, as needed or as determined by the COTR, to seal and isolate the work area from the remainder of the interior areas while the work is in progress. Wood used for protection of the site shall be pressure-impregnated, fire-retardant. All plastic sheeting shall be fire retardant 6-mil polyethylene. Submit product data to the COTR for review and approval.

27.5. The Contractor shall submit information describing the proposed construction of temporary enclosures and methods of installation to the COTR for approval. Any connections to existing structures must be accomplished in such a way as to minimize disturbance of existing surfaces.

28. PROTECTION OF FLORA, FAUNA AND CENTRAL COMPUTER CONTROLLER IRRIGATION SYSTEM

28.1. Tree Protection: The following procedures shall be followed for any project taking place on Smithsonian Institution grounds when any tree may be impacted.

28.1.1 Prior to any work taking place or vehicles and equipment being brought on site, the Contractor shall meet with the Smithsonian Gardens (SG) Arborist, Landscape Architect, and other appropriate staff to discuss and plan for tree protection measures.

28.1.2 The project site shall be defined, and all trees that may be impacted identified.

A. Where proposed utility work and connections cross roadways into adjacent SG property, the project site will include tree protection within the adjacent property if deemed necessary by the Smithsonian Gardens Arborist and/or other qualified SG staff.

28.1.3 For every tree that may be impacted, the Critical Root Zone (CRZ) shall be identified. The CRZ shall be determined by the following method:

- A. Measure the diameter of the tree at breast height (4.5 feet above grade), and for every inch of diameter, measure a distance of 1.5 feet from the trunk. The area inside this circle is the CRZ.

28.1.4 The following activities shall **NOT** take place in the CRZ, unless specified in a written tree protection plan pre-approved by SG:

- A. Stockpiling of materials, soil, mulch, or debris.
- B. Parking or driving of equipment or vehicles.
- C. Compaction of soil from any activity, including the placement of vehicles, materials, equipment, or outriggers.
- D. Trenching, tunneling, grade changing, or removing soil.
- E. Cutting, tearing, or grubbing of tree roots.
- F. Wounding trees in any way.
- G. Changing the site drainage.
- H. Dumping or spraying gasoline, oil, dirty water, or any chemical or material that can damage a tree.
- I. Using trees as backstops, winch supports, or anchors.
- J. Attaching anything to trees, including, but not limited to, signage, nails, screws, spikes, ropes, and wires.

28.1.5 Once the CRZ's have been identified, fencing shall be erected on the edge of the CRZ to prevent any activities from taking place in those zones. Fencing can consist of minimum 48" height (72" preferred) chain link or welded wire fence with steel posts set into the ground. Refer to Smithsonian Gardens standard Tree Protection Fence Detail. Alterations to or deviations from this detail shall be pre-approved by SG through the COTR. Orange construction fencing should NOT be used without advance approval of SG arborist.

Warning signs shall be placed on each CRZ fence, be a minimum size of 8.5 x 11 inches, and state the following: "TREE PROTECTION ZONE. This fence shall not be removed." Removal of fences, even temporarily, to allow deliveries or equipment access is not allowed without the prior approval of the Smithsonian Gardens Arborist or other qualified SG staff.

28.1.6 In the event that it is impossible to complete a project without some activity in a CRZ, a written tree protection plan pre-approved by SG shall be implemented. Tree protection plan requirements may include impact avoidance, root protection groundcover, air excavation and root pruning, supplemental watering, chemical applications, branch pruning and/or tiebacks, and/or any number of other industry standard tree protection methods generally reviewed in the *Managing Trees During Construction Best Management Practices* manual (Fite and Smiley 2016) and other literature reviewing tree care industry standard tree protection practices.

A. Boring of utilities under protected root zones shall be required in circumstances where it is not possible to trench around a CRZ. Refer to Smithsonian Gardens standard Tree Protection Utility Boring Detail.

28.1.7 During the project, project activities shall not physically impact the tree or delineated CRZ, unless described in tree protection plan pre-approved by SG. The impacted trees shall also be closely monitored for signs of shock or stress. Any decline in tree condition that is noted by the Contractor shall be immediately reported to the SG Arborist or other staff. The Contractor shall be prepared to provide temporary water to irrigate.

28.1.8 Upon completion of the project, all trees within the project area will be inspected by the SG Arborist and/or other qualified SG staff for any signs of tree damage, soil compaction, and/or other negative impacts to the site. If any issues are found, the Contractor shall be responsible for remediation activities including, but not limited to, root zone invigoration/air spading, liquid fertilization/bio-stimulant injections, root pruning, branch pruning, bark tracing, and/or supplemental watering.

28.1.9 If a tree is found by the SG staff to be irreversibly damaged, the Contractor will be required to proceed with one of the following as determined by the SG staff: either to install a replacement tree of matching size, quality, and variety, using a contractor designated by SG or to reimburse for the cost of the tree as set forth in the *Guide for Plant Appraisal, 10th Edition*, using the Direct Cost Method. If an acceptable tree is not available, the Contractor will be required to pay damages to SG for the value of the damaged tree in accordance with the guidelines set forth in the *Guide for Plant Appraisal, 10th Edition*, using the Trunk Formula Method.

28.2 Flora Protection: The Contractor is expressly prohibited from collecting plant materials on Smithsonian property.

28.3 Soil, Turf and Planting Bed Protection: Vehicular traffic or parking on turf areas or on planting beds is not permitted without prior approval of the Smithsonian Gardens through the COTR. If turf areas or planting beds must be crossed by vehicles, beds bridging is required.

The Contractor shall meet with the Smithsonian Gardens (SG) Arborist, Landscape Architect, and other appropriate staff to discuss required protection measures. The scope of work and types of vehicles or machinery being used will determine the selection of the following techniques. Install any underlayment or drainage for these protection measures as directed by the associated standard details.

A. $\frac{3}{4}$ ' Temporary Plywood Matting – used in zones of low vehicle traffic, including lighter weight vehicles (lulls, skid steer loaders, or equivalent) where

the duration of use does not exceed three days. Refer to Smithsonian Gardens standard Temporary Soil Protection – Plywood Matting Detail.

B. Rigid Plastic Decking (Geoterra Mats include underlying layer (e.g., Rigid Plastic Decking (Geoterra Mats) Over Geocomposite Drain Layer) – used in main circulation zones with high vehicle traffic, including wheeled vehicles or machinery of H20-rated loading or greater; and where sensitive and newly installed soil is located. Refer to Smithsonian Gardens standard Soil Protection – Geoterra Mats Detail.

C. Timber Mats – used in zones of high vehicle traffic, where heavy (H20-rated loading) vehicles and machinery are entering or exiting the project site; and where sensitive and newly installed soil is located. Refer to Smithsonian Gardens standard Soil Protection – Timber Mats Detail.

28.3.1 The Contractor shall be responsible to ensure that no soil disturbance, compaction, or other damages will occur from construction traffic or other construction activities. Any such disturbance, compaction, and/or damage shall be repaired by the Contractor at no additional expense to Smithsonian Gardens.

28.3.2 Repair and re-establish grades where turf and bed surfaces have become eroded, rutted, or compacted. Scarify, or, if directed by the COTR or other appropriate SG staff, remove and replace soil (with approved soil material) to the depth as directed.

28.3.3 Any soil area that becomes compacted to a density greater than 85 proctor density (or 300 lbs per sq ft) and/or the determined maximum by the COTR or SG staff shall be dug up and reinstalled. Surface tilling shall not be considered adequate to reduce over-compaction at levels 6" or greater below finish grade.

28.4 If a generator is placed on the turf, Smithsonian Gardens must have approved its placement. Generator shall be placed on anti-compactor boards. The generator must be placed in a drip containment basin.

28.5 Where aerial work is being performed above shrub/planting beds, the Contractor shall protect them with an approved protective framework installed at least 300 mm above the tops of the plant materials. The Contractor shall submit the proposed method of protection to the COTR and Smithsonian Gardens for approval. Trees and shrubs shall only be tied back with the approval of the COTR and Smithsonian Gardens.

A. Trees in proximity to construction equipment with moving arms at heights above standard protection fencing shall have their trunks protected. Refer to Smithsonian Gardens standard Trunk Protection Detail.

B. Once work is complete, all fallen debris within a 10' radius of scaffolding shall be removed from the surface of the soil and any plants beneath. The

Contractor shall utilize magnetic sweepers and metal detectors to remove any fallen metal debris and construction materials.

28.6 Irrigation Protection: Smithsonian Gardens should be notified immediately, should any damage occur to existing irrigation systems during construction. Any damage to the existing irrigation systems during construction shall be repaired by the Contractor within two calendar days from when the damage occurred. All repairs to the irrigation system shall be made by a certified irrigation contractor to work on Rain Bird Maxicom computer controlled irrigation systems. Certification is required.

28.6.1 Damaged piping shall be replaced using approved materials per section Division Two, "Site Work, Irrigation Systems".

28.6.2 The Contractor shall bear all costs for repairs to the damaged irrigation system. Where the low voltage control wiring is damaged due to construction then said wiring shall be replaced from the zone valve to controller. No splicing will be permitted.

28.6.3 Mainlines damaged during the construction process shall be replaced with an identification wire from valve to controller.

28.6.4 All damaged irrigation piping shall be cleared of debris prior to making the permit connections.

28.7 Replacement Plants: The Contractor shall bear all costs for replacement of damaged plant materials. Replacement plant materials shall meet the criteria established by the Smithsonian Gardens. Any plant material destroyed and/or damaged by the Contractor during construction shall be replaced with like genus and species of the same size, at no additional cost to the Smithsonian.

28.8 Replacement Turf: Turf areas damaged during construction shall be repaired by the Contractor according to Smithsonian Gardens Lawns and Grasses Specifications (329200). Replacement turf shall be sod, not seed. Contractor shall request a copy of Lawns and Grasses Specifications prior to commencing repair. Specifications include rototilling a minimum depth of 6 inches, backfilled with sandy-loam topsoil. Prior to installing sod, contractor shall obtain Smithsonian Gardens acceptance of finish grading. Sod shall be certified sod, non-netted and a minimum of one year old. Sod shall be 90:10, consisting of a minimum of three varieties tall fescues and one Kentucky Bluegrass. Smithsonian Gardens through the COTR must approve the source of the sod. Following installation, sod shall be rolled by hand with a water roller to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. The Contractor shall bear all costs for these repairs. Suggested sources are:

1. Oakwood Sod Farm, Inc.
29307 Waller Road
Delmar, MD 21875

Phone: (410) 896-4009
Toll-Free: (800)379-8488

2. Collins Wharf Sod
25361 Collins Wharf Rd
Eden, MD 21822
Phone 410-334-6676
Fax 410-749-3815
cwsod@collinswharfsod.com

3. Summit Hall Sod Farm
21300 River Road
Poolesville, MD 20837-9114
Phone: 301-948-2900
Fax: 301-349-2668

28.9 Replacement Soil: Planting soil damaged by compaction or removed during construction shall be repaired or replaced. All removed soil shall be stored on site, protected properly, and used for replacement. Any replacement soil brought from off-site shall match the existing soil texture. Smithsonian Gardens, through the COTR, must approve the source of any replacement soil before procuring and transporting the soil to the site.

28.10 Compacted Soil: Planting soil damaged by compaction during construction shall be repaired or replaced. Before the Contractor concludes their Work (at time of Substantial Completion or Final Review), they must notify the Smithsonian Gardens, through the COTR, to check for compaction. If compaction has occurred, the Smithsonian COTR will direct the Contractor to the proper remediation process and details based on the depth of compaction found to be present.

28.11 Artifacts and Furniture Collection Pieces: Smithsonian Gardens requires (5) working day notice should any of the artifacts or furniture collection need to be removed to facilitate construction. Any artifacts or furniture collection piece damaged during the construction process must be replaced prior to final payment.

28.12 Trash and Debris Removal: The Contractor shall be responsible for the daily removal of trash and construction debris from turf and flower/shrub beds within the limits of construction.

28.13 Scaffolding: Any construction scaffolding on turf and planted beds must be coordinated with the Smithsonian Gardens through the COTR to ensure that its installation will not damage or destroy existing plant materials or turf area or interfere with daily

maintenance of the grounds. Trees may be tied back to permit erection of scaffolding, no more than 4 feet if possible. The tying back must be performed by a certified Arborist with the approval of Smithsonian Gardens and the COTR. Where scaffolding is necessary to facilitate construction, Smithsonian Gardens requires a three (3) workday notice for said work.

28.14 Haupt Garden: Due to structural weight limits, vehicular traffic is permitted inside the Smithsonian's Enid A. Haupt Garden only with prior approval by the COTR and Smithsonian Gardens.

28.15 Fauna Protection: The Contractor is prohibited from hunting, collecting, or feeding animals on Smithsonian property. All food and food wrapping brought on the premises must be properly disposed of in approved containers which are secured from animals.

29. DEBRIS CONTROL AND DAILY CLEANUP

29.1. The Contractor shall regularly clean up the work areas and shall, at all times, maintain the project in as neat and orderly a manner as is consistent with normal operations. Debris resulting from construction operations shall be removed from the site daily by the Contractor. The Contractor shall keep all access, haul routes and site areas free of dirt, debris and other materials resulting from construction activities.

29.2. Under no circumstances shall any rubbish or waste be dropped or thrown from one level of scaffolding to another or within or outside the building. Rubbish may be lowered by way of chutes, taken down on hoists or lowered in receptacles.

29.3. Trash receptacles: The Contractor shall provide enclosed trash receptacle(s) in quantity and size necessary to meet project needs, located as approved by the COTR. Trash receptacles shall not be placed where visible to the public or where they will impede the movement of vehicles on the site.

29.4. Refer to section 01 7419 (OPDC Project No. 2200107) on Construction Waste Management and Disposal following this section 01 0000.

29.5. Provide the Construction Waste Management and Disposal Tracking Sheet following this section 01 0000 (OPDC Project No. 2200106) and section 01 7419 (OPDC Project No. 2200107) with each invoice.

30. DUST AND AIR QUALITY CONTROL

30.1. The Contractor will execute the Work by methods that minimize dust, vapors and gases raised by construction operations. The Contractor will utilize engineering controls and work practices to prevent airborne dust, vapors, gases and objectionable odors from dispersing into the atmosphere and from being drawn into existing air-intake louvers,

ductwork and adjacent elevator shafts. A work plan of methods and means for this section shall be submitted to the COTR for review and approval.

30.2. Dust barriers shall be erected, where necessary, to protect adjacent areas from dust infiltration as required by the COTR. Dust barriers shall be rigid and visually opaque and shall seal the work area by affixing to the structure on all sides (i.e. ceiling, walls and floor). Wood used for dust barriers shall be pressure-impregnated, fire-retardant treated lumber. All plastic sheeting shall be fire-retardant 6-mil polyethylene. Submit product data for review and approval to the COTR.

30.3. Means of connection of dust barriers to existing structures shall not damage the building fabric. Details of barriers shall be submitted for approval to the COTR.

30.4. No open fires or burning of trash are permitted.

31. NOISE CONTROL

31.1. The Contractor shall comply with the regulations of the District of Columbia and OSHA Standards 1926.52 and 1910.95 and all other regulations relative to safety noise control.

31.2. Activities that generate excessive noise or vibration and interrupt museum functions or create public disturbances may be required to be performed during off-hours at the discretion of the COTR.

31.3. The Contractor shall provide sound attenuation to maintain acoustic level below 75 dBA at a distance of 15 m or below 75 dBA in occupied staff areas if less than 15 m away from noise source.

32. VERMIN, PEST AND RODENT CONTROL

32.1. The Contractor shall develop an Integrated Pest Management (IPM) plan and provide regularly scheduled inspection services by a licensed Pest Management Professional to manage and, when possible, to eliminate insects, rodents, birds, arachnids and other miscellaneous pests invading the project site or premises for the duration of the project. In general, preventative pesticide applications are prohibited. Preventative pesticide applications may be made when there is a surveillance-based indication of pest infestation. Such applications shall be made on a case-by-case basis and only upon written approval of the COTR prior to such application. The IPM plan must address all the specific IPM requirements listed in the Leadership for Energy and Environmental Design (LEED™) Existing Buildings: Operations & Maintenance Indoor Environmental Quality (IEQ) Credit for Green Cleaning: Indoor Integrated Pest Management, including preferred use of nonchemical methods, the use of least toxic pesticides as identified by San Francisco Tier 3 Low Hazard pesticides ([SF Pesticide Hazard Screening List](#)), the definition of emergency conditions (defined as a threat to landscape, building integrity or human occupancy after non-chemical methods have been exhausted) and universal notification (advance notice of not less than 72 hours under normal conditions and 24

hours in emergencies before a pesticide, other than a least toxic pesticide, is applied in a building or on surrounding grounds that the building management maintains). Any outdoor IPM plan must also be integrated with any indoor IPM plan for the building, as appropriate.

32.2. Throughout the term of this contract, all Contractor personnel providing on site pest control service must maintain pesticide certification(s) as a Commercial Pesticide Applicator in the appropriate EPA category (Industrial, Institutional, Structural and Health Related Pest Control). Minimum pesticide certification is to include General Pest Control and Rodent Pest Control categories.

32.3. The Contractor shall describe methods and procedures to be used for identifying sites of pest harborage and access and for making objective assessments of pest population levels throughout the term of the contract.

32.4. The Contractor shall provide photocopies of state-issued Commercial Pesticide Applicator certificates for every Contractor employee who will be performing on site pest management services under this contract, as well as current Pesticide Business Licenses for the state(s) in which these services are to be performed.

32.5. All employees of the Contractor performing pest control services on the site(s) specified in this solicitation shall carry with them, as required by law, their personal pesticide identification card.

32.6. Other employees of the Contractor who are not certified in any applicable pest control category shall, as a condition to performing pest management services under this contract, meet one of the following requirements:

32.6.1. Shall perform pest management services under the direct and immediate supervision of the Contractor's certified pesticide applicator(s).

32.6.2. Will have obtained a written waiver of this provision from the COTR based upon the employees' special qualifications and /or exigent circumstances. The COTR shall have complete discretion to approve or disapprove such waiver.

32.7. The Contractor shall be responsible for advising the COTR about any structural, sanitary or procedural modifications that would reduce pest food, water, harborage or access.

32.8. The Contractor shall obtain the approval of the COTR prior to any application of sealing materials or other structural modifications to prevent the introduction of pests into the project site or premises.

32.9. The Contractor shall be responsible for carrying out work according to an approved pest management plan. The Contractor shall receive concurrence of the COTR prior to implementing any subsequent changes to the approved pest management plan, including additional or replacement pesticides and on site service personnel.

32.10. On occasion, the COTR may request that the Contractor perform corrective, special or emergency pest control services that occur outside routine service hours. The Contractor shall respond to all such requests within four (4) hours after receipt of the request.

32.11. The Contractor shall submit the following information to the COTR for approval at least ten (10) working days prior to the use of any pesticide or chemical:

32.11.1. Material Safety Data Sheets (MSDSs) for the pesticide or chemical being used.

32.11.2. Written description of each proposed type of use, targeted species and restrictions on use of the area treated during and after application.

32.12. The Contractor shall remove dead rodents from the premises within 24 hours. Dead rodents in inaccessible areas may be treated with dilute sodium hypochlorite, neutrolem alpha or similar disinfecting or deodorizing agent. Trapping devices are the preferred method for the control of commensal rodents. The Contractor shall be responsible for disposing of all trapped rodents and all rodent carcasses in an appropriate manner.

32.13. The Contractor shall use the safest means to protect Smithsonian property during pest management operations. If damage to artifacts, collections or any SI property occurs, the Contractor must not attempt any remedial action. The collections manager, COTR and/or building manager must be notified immediately.

32.14. Pesticides that constitute an extreme hazard to the environment, such as rodenticides, shall be placed in locations not accessible to children, pets and non-target wildlife or in EPA approved "tamper-resistant" bait boxes. Tamper-resistant boxes shall be constructed of sturdy materials, have a means for locking lids and be capable of being anchored securely to prevent unauthorized efforts to move the box or to displace its contents.

32.15. All bait boxes shall be maintained in accordance with EPA regulations, with an emphasis on the safety of non-target organisms. The Contractor shall adhere to the following points regarding bait box policy:

32.15.1. All bait boxes shall be placed out of the general view, in locations where they will not be disturbed by routine operations.

32.15.2. The lids of all bait boxes shall be securely locked or fastened shut.

32.15.3. All bait boxes shall be securely attached or anchored to the floor, ground, wall or other immovable surface, so that the bait box cannot be picked up or moved.

32.15.4. Rodenticide bait shall always be secured in the feeding chamber of the bait box and never placed in the runway or entryways of the bait box.

32.15.5. All bait boxes shall be labeled on the inside with the Contractor's business name, address and dated by the Contractor's service specialist at the time of installation and with each service.

32.16. Application of rodenticide outside of buildings shall emphasize direct treatment of rodent burrows, with the application of tracking powder favored over application of anticoagulant type rodenticides.

32.17. The Contractor shall minimize the use of and potential exposure to pesticide wherever possible through the use of nonchemical control methods and materials.

32.18. When it is determined that a pesticide must be used in order to obtain adequate control, the Contractor shall utilize the least hazardous material, most precise and species-targeted application and the minimum quantity of pesticide necessary to achieve control.

32.19. The Contractor shall be required to maintain an accurate, up-to-date pest activity logbook(s) to document pest sightings, pest control procedures and any communications to staff regarding IPM or pesticide use. The logbook(s) shall be kept on site and maintained on each visit by the Contractor.

32.20. The Contractor shall observe all pesticide safety precautions throughout the performance of this contract. All work shall be in strict accordance with all applicable Federal, State and Local safety and health regulations. Where a conflict between applicable regulations arises, the most stringent will apply.

32.21. The Contractor is prohibited from storing any pesticide product in the buildings specified in this contract.

32.22. The Contractor shall establish a complete Quality Control (QC) program to assure the requirements of the contract are provided as specified in accordance with this solicitation. The QC program shall include at least the following items:

32.22.1. Inspection System: The Contractor's quality control inspection system shall cover all the services stated in this contract. The purpose of the QC program is to detect and correct deficiencies in the quality of workmanship before the level of performance becomes unacceptable and/or the COTR identifies the deficiencies.

32.22.2. A quality control checklist shall be used in evaluating contract performance during regularly scheduled and unscheduled inspections. The checklist shall include every building or site serviced by the Contractor as well as every required task.

32.22.3. A Quality Control (QC) file shall contain a record of all inspections conducted by the Contractor and any corrective actions taken. The QC file shall be maintained throughout the term of the contract and made available to the COTR or authorized SI staff personnel, upon request.

32.22.4. The Contractor shall state the name(s) of the individual(s) responsible for performing the Quality Control (QC) inspections.

33. DRILLING, WELDING AND TORCH CUTTING

33.1. Daily Permits: When welding, torch cutting or other heating operations are to occur inside existing structures, the Contractor shall obtain a daily HOT WORK PERMIT from the Building Manager's Office. Permit must be obtained no more than 24 hours in advance, including for days following holidays, Mondays and off-hours (night) work. Reference attached Hot Work Permit form and General Instructions for required permit process. The PAI (Permit Authorizing Individual) will be available in the Building Management Office and/or throughout the Facility. Building Management Office hours are from 8am to 4pm. The permit must be posted at the job site prior to beginning the scheduled work. During the course of the Work, all existing smoke and heat detectors and sprinklers heads must remain operable. Coverings may be applied to protect them from spray coatings or other hazardous conditions only during the actual operations. Coverings must be removed immediately after the operations have concluded, but at the end of each working day at a minimum. When work produces dust or other airborne contaminants, e.g. spray painting, that could impair existing fire suppression or detection system(s) or when the system itself is otherwise impaired (drained down, etc.), the Contractor shall obtain a daily FIRE SYSTEM IMPAIRMENT PERMIT. Fire System Impairment Permit must be obtained a minimum of 48 hours in advance. Reference attached Fire System Impairment Permit form and General Instructions.

33.2. Fire Watch: No welding or torch cutting shall be performed unless adequate fire protection is provided. The Contractor shall maintain a fire watch for the duration of welding, cutting and heating operations and for at least 30 minutes after the 'hot' work has stopped. A fire extinguisher (minimum 10 pounds, dry-chemical type, typical) shall be on hand when drilling, welding or cutting.

33.3. Use of Impact Hammers: The use of impact hammers or other equipment causing vibration, noise and dust may be harmful to collections and/or building occupants. The Contractor shall request approval from the COTR at least five (5) working days before beginning this type of work to ensure adequate time for notification of building occupants and protection of objects and collections.

33.4. Ventilation: The Contractor shall provide adequate ventilation to prevent air contamination or the accumulation of toxic materials. Take necessary measures to prevent welding fumes from passive transfer to adjacent areas and from entering mechanical ventilation systems, including sealing all adjacent ducts and equipment openings with plastic. Where transfer is deemed likely or verified by the COTR, utilize local exhaust ventilation with HEPA filtration to control welding fumes. The Contractor shall

submit means and methods for controlling air contamination to the COTR for review and approval.

TEMPORARY CONSTRUCTION FACILITIES

34. CONTRACTOR FIELD OFFICES, TRAILERS AND SHEDS

34.1. The Contractor shall establish a temporary office at the project site. Office space will be provided within NMNH in an area designated by the COTR as shown on the Contract Drawings. The Contractor shall provide information about proposed locations of any temporary office, sheds, trailers and staging and storage areas and designation of size, color and materials to the COTR for approval at least five (5) working days prior to mobilization. These items must fit into the space allotted for Contractor use during this project. No additional space will be provided for offices, staging or storage.

34.2. The Contractor may provide his own locking device on the door to the temporary office, trailer or shed. The Contractor shall be solely responsible for the safekeeping and security of the construction facilities, materials and equipment.

34.3. Upon completion of the Work, the temporary offices, trailers and sheds shall be removed and the area returned to its original pre-contract condition.

35. STAGING, STORAGE AND WORK AREAS

35.1. The Contractor shall provide adequate storage and protection of materials and equipment delivered to the site to prevent theft, weather damage, mold infiltration, moisture damage and other physical damage.

35.1.1 The general contractor shall be allowed use of a TBD location for a full-time dumpster. An additional space for a part-time dumpster may be provided on an as-needed basis for demolition activities, etc. The contractor shall relinquish use of (1) parking space to SI upon removal of dumpster. Coordinate with COTR.

35.2. Plan for Staging, Storage& Work Areas: The Contractor shall submit a drawing (scale 1" = 20') of areas proposed for construction operations for approval by the COTR at least five (5) working days prior to mobilization or at the Preconstruction Meeting, whichever is first. The drawing shall show buildings, utilities, temporary toilet facilities, temporary utility extensions, temporary interior walls and barriers to limit unauthorized intrusion and to control noise and dust, pedestrian walkways, vehicular access, temporary fencing, trailers, sheds, storage areas and the Contract's desired route for access and egress to the premises and to the project site.

35.3. All wood used for temporary, interior construction shall be pressure-impregnated with a "Dricon" treatment or an equal treatment approved by the Smithsonian Institution. All pieces must bear the UL "FR-S" stamp. Intumescent (fire-retardant) paint shall not be used. All plastic sheeting shall be fire retardant 6-mil polyethylene. Submit product data to the COTR for review and approval.

35.4. Fencing: The Contractor shall install a "snow fence" to define the temporary work limits for construction around exterior staging, storage and work areas at no additional cost to the Smithsonian. The snow fence shall consist of 40 mm x 13 mm slats, preservative treated, 1.2 m high with 12 gage wire and 50 mm spacing between slats, on 1.8 m steel pickets with 1.8 m on center spacing.

35.5. Fencing: The Contractor shall provide and maintain a construction fence surrounding the project in accordance with the contract plans and technical specifications.

36. SANITARY FACILITIES

36.1. Contractors' personnel shall not be permitted to use public toilet rooms on the premises. The Contractor shall provide and maintain separate temporary sanitary facilities at locations approved by the COTR and shall remove the facilities at the completion of the work.

37. TEMPORARY UTILITY SERVICES AND EXTENSIONS

37.1. Existing electrical outlets and water connections are noted on Sheet G002 (OPDC Project No. 2200106).

37.2. Temporary electrical service connections may be required to operate contractor's hoists and power tools. Contractor shall provide an electrician at no additional cost to the Smithsonian to assess the adequacy of existing service and power needs and to make necessary temporary power connections and provisions.

37.2.1 Contractor's electrician shall work closely with NMNH Building facilities personnel to identify potential areas to connect to building's existing electrical service panels.

37.2.2. Any service interruptions required to connect to existing service panels will need to be closely coordinated with building facilities personnel and will need to be done outside normal working hours.

37.2.3. The Smithsonian Institution does not warrant that existing electrical service will be adequate for loads imposed by Contractor's equipment.

37.2.4. If existing connections and service prove to be inadequate, Contractor will need to provide inverter type generators to run equipment as needed.

37.3. Use of existing water connections shall be closely coordinated with building facilities personnel.

37.3.1. Exterior water connections are typically shut off during winter months.

37.3.2. Short-term connections to existing lawn irrigation system on the Constitution Ave side are possible but must be closely coordinated with Smithsonian Horticultural personnel and require a special fitting attachment.

37.3.3. The Contractor shall submit a written request as far in advance of scheduled water needs as possible, but no less than two (2) full weeks in advance.

37.3.4. Hoses running along the ground must be covered with hose protector ramps in areas of likely pedestrian or vehicular traffic.

38. SCAFFOLDING AND PLATFORMS

38.1. The Contractor shall erect temporary scaffolding in accordance with OSHA 29 CFR 1926.451 and ANSI A10.8. The Contractor shall provide landing platforms with stairways or ladders for proper access and egress to all work areas. For high work, utilizing scaffolds or any other means, protection must include, at minimum, toe boards to prevent any possible hazards below.

38.2. For all frame scaffolding greater than 4 m in height, the Contractor shall submit working drawings to the COTR a minimum of ten (10) working days in advance of scaffolding erection. Working drawings submitted by the Contractor shall be certified by a registered Professional Engineer.

38.3. During non-working hours, the Contractor shall close and lock the scaffolding with a physical barrier to prevent access by unauthorized persons.

38.4 The Contractor shall be solely responsible for all methods and means of construction. All rigging equipment and procedures shall be in accordance with applicable codes and standards. The Contractor shall make any inspections or provide any analysis required to verify that existing building elements have adequate load capacity to support any required rigging forces he/she chooses to impose upon them. All loads applied to the SI building shall be approved by the OPDC to verify capacity. All calculations shall be performed and stamped by a licensed professional engineer in the District of Columbia. The Contractor is to provide stamped and sealed drawings and calculations for all scaffolding, stages, and other similar means of access.

38.5 No entrances, egress routes, Fire Department Connections (FDCs), or other emergency services shall be blocked by scaffolding, materiel, or work activities when the building is occupied.

38.5.1 See also National Museum of Natural History Life Safety Master Plan, Appendix D Sheets AL-103 and AL-104 for detailed egress route information and exit locations.

39. PROJECT SIGNS

39.1. All signs, including signs identifying the Contractors, shall be submitted at least five (5) working days prior to erection for approval by the COTR. The Contractor shall maintain

and relocate the signs, as necessary, during the progress of the Work. The Contractor shall remove all signs, framing and foundations at the completion of the Work.

39.2. Construction Site Information and Direction: Informational signs required to indicate the location of the Contractor's office and directional signs for safety, vehicular control, pedestrian right-of-ways, detours to facilities, etc. shall be furnished and installed by the Contractor as requested and approved by the COTR.

MEETINGS

40. PRECONSTRUCTION MEETING

40.1. A Preconstruction Meeting will be scheduled with the Contractor before any work is started at the site. As soon as possible after the Date of Award, the COTR will contact the Contractor to arrange a time, date and place for the conference. Items to be discussed at the Preconstruction Meeting include, but are not limited to:

- 40.1.1. Contract Time: Notice to Proceed date and Completion date;
- 40.1.2. Scheduling and Submittals;
- 40.1.3. Mobilization and Staging;
- 40.1.4. Access to the Premises, Haul Routes, Loading Dock;
- 40.1.5. Contractor Deliveries;
- 40.1.6. Security Requirements/List of Contractor's Personnel;
- 40.1.7. Emergency Procedures and Phone Numbers;
- 40.1.8. Protection of Site and Historic Preservation;
- 40.1.9. Fire Protection and Safety Requirements;
- 40.1.10. Utility Interruptions, Rough-in Inspections, Testing;
- 40.1.11. Applications for Payment;
- 40.1.12. Pre-Condition Survey of the Site;
- 40.1.13. Accessibility Requirements;
- 40.1.14. Sustainability Requirements;
- 40.1.15. Building Systems Commissioning;
- 40.1.16. QualityControl;
- 40.1.17. Preservation of Wildlife and Natural Resources.

40.2. The Contractor's key staff and representatives of all Subcontractors or Suppliers shall attend the Preconstruction Meeting.

40.3. Coordination Plan: The Contractor shall use the Preconstruction Meeting to develop a Coordination Plan for interaction with other parties working in or using the facility. The plan shall be submitted no less than five (5) working days after the Preconstruction Meeting and shall address interactions with other contractors, tenants, the public and any others making use of the site and surrounding areas. As a minimum it shall include:

40.3.1. Locations of overlap in use of the site by the Contractor and others, including work areas, delivery points, access/egress areas.

40.3.2. Specific items of work by others required to support critical milestones in the Contractor's schedule.

40.3.3. Coordination with the work of the designated Commissioning Provider.

40.3.4. Completion or delivery of work by others that may impact the Contractor's schedule.

40.3.5. Portions of the work that create special hazards or disturbances.

40.3.6. Portions of the work that affect utilities, fire-protection or detection systems or security systems.

40.3.7. Events requiring access to areas outside of the project site or secured spaces.

40.3.8. Protection to be provided by the Contractor for work completed by others either before or during this project.

41. PRE-CONDITION SURVEY OF THE SITE

41.1. After the Preconstruction Meeting and before the start of work on the site, the project site (i.e. building, its contents, grounds and equipment) shall be inspected by the Contractor, major Subcontractors, COTR and other Smithsonian Institution personnel as may be required for the purpose of verification of the existing conditions. Any damages or defective equipment will be noted at this time and this survey will serve as the basis for the establishment of the pre-contract conditions. The identification of pre-contract conditions will be jointly established by the Contractor and Smithsonian Institution.

41.2. Written and photographic documentation: The Contractor shall prepare a typewritten and photographic report in PDF format to identify damages or defects of materials, equipment and the site. The Contractor shall submit report electronically to the Contracting Officer and the COTR.

41.3. Videotape documentation: The Contractor shall videotape and document the observations made during the survey of the existing conditions for buildings, improvements, finishes, utilities, interior surfaces, construction and other systems,

components or materials, which might be affected by the Work, including sidewalks, streets and adjacent facilities. The Contractor shall employ a professional photographer and use DVD format. The Contractor shall prepare the video report in triplicate copies. The Contractor shall retain one video report and shall submit one video report each to the Contracting Officer and the COTR. The typewritten and photographic report and video reports shall be complimentary in content and shall be submitted together.

42. PROJECT MEETINGS

42.1. Progress Meetings: The COTR will lead regular progress meetings with an interdisciplinary integrated management team consisting of representatives of the Contractor, Smithsonian, Architect/Engineer Commissioning Provider, major Subcontractors and other critical Subcontractors and suppliers. The purposes of these meetings are to expedite the work, coordinate and schedule the Work and coordinate the work with Smithsonian activities. Progress meetings shall be held weekly unless otherwise directed by the COTR. The time and place of the meetings will be established at the Preconstruction Meeting. The Contractor shall ensure that all required Subcontractors and suppliers attend the Progress Meetings and the COTR will ensure that all necessary SI personnel attend.

42.2. Special-Topic Meetings: At the discretion of the COTR, additional meetings may be scheduled to address issues of quality control, sustainability requirements, coordination between contractors on the premises, coordination with other agencies, scheduling of the work, application for payments, etc. The Contractor's staff and Subcontractors or Suppliers shall attend.

42.3. Meeting Minutes: The Contractor shall promptly prepare minutes of each meeting and transmit, to the COTR, within five (5) working days.

SUBMISSIONS

43. SUBMITTAL DEFINITIONS

43.1. Submittals are defined to include shop drawings, product data, samples and additional data required for submission to the COTR for review and approval prior to incorporation into the work.

43.1.1. Shop Drawings: Detailed drawings, schedules, diagrams and illustrations prepared specifically for this project by the Contractor or any subcontractor, manufacturer, supplier or distributor to illustrate fabrication and/or installation of a portion of the Work.

43.1.2. Schedule: A detailed tabulation of components, items or parts to be furnished for use on this project.

43.1.3. Statement: An affirmation prepared by the Contractor, the installer or manufacturer of a material, product or system, to satisfy a requirement defined in a technical section.

43.1.4. Factory Test Report: A written report of the findings of a test performed by the Contractor on an actual portion of the Work or prototype prepared for this project before it is shipped to the site.

43.1.5. Field Test Report: A written report of the findings of a test performed by the Contractor on a portion of the Work during or after installation.

43.1.6. Certificate of Compliance: A written statement, signed by an authorized official of the manufacturer of a product or system or supplier of a material attesting that the product, system or material meets the requirements of the contract documents. The certificate of compliance must be dated after the award of this Contract and must name the project and cite the specification section, paragraph and requirements, which it is intended to address.

43.1.7. Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature and catalog information illustrating a material, product or system to be installed on this project, including all data related to LEED requirements, such as recycled and regional content information, Volatile Organic Compound (VOC) product schedules, Forest Stewardship Council (FSC) chain-of-custody documentation and other documentation as requested by the COTR.

43.1.8. Color Charts: Pre-printed brochures showing the color range of a material.

43.1.9. Test Reports: Reports verifying that a material, assembly, system, process or laboratory meets requirements established in the Contract Documents. Reports shall indicate compliance by naming and describing the test method and test results. Testing must have occurred within three (3) years of the date of award of this contract.

43.1.10. Samples: Physical examples of materials, equipment, assemblies or workmanship establishing standards for evaluating finished Work.

43.1.11. Color/Texture Selection Sample: Samples of an available range of textures and/or colors of a material formed of the actual finish material over a substrate identical to that which will be used in the field.

43.1.12. Mock-up: An assembly or sample panel constructed in accordance with specifications to show construction details, finished appearance and/or performance.

43.1.13. Material Safety Data Sheets: Instructions, warnings and recommended and required handling and use procedures for individual hazardous materials published by the product manufacturer.

44. SUBMITTALS AND REVIEWS

44.1. Contractor Responsibility for Submittals: The Contractor shall provide all required submittals, by technical specification section, in accordance with the contract documents. All submittals, with the exception of mockups or samples, are to be submitted electronically in PDF format, using e-mail, the Smithsonian's I-Manage portal, or a contractor-sponsored FTP site, as directed by the COTR. The Contractor shall clearly indicate, on the submittal, that it has been reviewed by the Contractor and found to meet the project requirements. Any items submitted as substitutions shall be clearly identified as such on the submittal and the transmittal document. If shop drawings show variations from the contract documents because of standard shop practices or for other reasons, the Contractor shall provide a separate, written description of variations along with the submittal. The Contractor shall:

44.1.1. Review each submittal for conformance with requirements of the contract documents and coordination with related work.

44.1.2. Determine and verify all field measurements, required material quantities, method of assembly or erection, installation requirements and proper connection to adjoining materials installed by others.

44.1.3. Assure that all submittals use the appropriate units of measure. All drawings and technical data shall be in SI (metric) units for projects designed in SI units. Preprinted literature in other units shall be accompanied by documentation to show conformance to project requirements.

44.1.4. Transmit all required submittals for a technical specification section at the same time unless prior written waiver of this requirement has been provided by the COTR.

44.1.5. Transmit submittals to the COTR in a logical and orderly sequence in accordance with the Submittal Schedule to prevent project delays or adversely impact work by the Smithsonian Institution or other contractors.

44.1.6. Correct and resubmit submittals according to response from Smithsonian Office of Planning, Design & Construction.

44.1.7. Commence work on items requiring submittals only after all related submittals are reviewed and approved by the Smithsonian. All Work shall conform to approved submittals.

44.2. Submittal Schedule and Control Log: The Contractor shall submit, to the COTR, a schedule of work-related submittals using the Smithsonian OFEO Submittal Log form

within fourteen (14) calendar days after the effective date of the Notice to Proceed. (Submittal Log form is available on computer disk upon request.) Submittals shall be listed in the order they are scheduled to be submitted and the following information shall be given:

- 44.2.1. Project Name, Project Number, Contractor Name, Contract Number;
- 44.2.2. Technical Specification Section for each submittal;
- 44.2.3. Unique Submittal Number;
- 44.2.4. Description of item to be submitted, as listed in the specifications;
- 44.2.5. Date item must be submitted to the Smithsonian in order to support the project schedule;
- 44.2.6. Subcontractor providing submittal (in "Comments" column).

44.3. Quantities for Submittals: Unless otherwise noted in the technical specification, the Contractor shall deliver to the COTR:

44.3.1. Shop Drawings: Submit electronic copy of shop drawings in PDF format. Submittal will be forwarded electronically to the AE for review. After submittal review, submittal will be returned to the Contractor electronically, in PDF format. Submit in DWG format, if requested.

44.3.2. Product Data, Test Reports, Color Charts, etc.: The Contractor will make submittals in electronic format, preferably PDF.

44.3.3. Color/Texture Samples: Submit two (2) samples, minimum size 600 mm by 600 mm, unless otherwise specified. After submittal review, one (1) sample may be retained by the Smithsonian.

44.3.4. Mock-up and Sample Installations: Unless otherwise specified, minimum size shall be as noted to complete a panel section or normal break in the work.

44.3.5. Written Text Documents, Plans and Reports: Submit electronic copy of written text documents, plans and reports in PDF format. Submittal will be forwarded electronically to the AE for review. After submittal review, submittal will be returned to the Contractor electronically, in PDF format.

44.4. Submittal Reviews by the Smithsonian: Reviewed submittals will be marked "Approved," "Approved as Noted," "Resubmit" or "Disapproved." Submittal approval by the Smithsonian shall not relieve the Contractor of responsibility for submittal errors, omissions or deviations from the contract documents. Approval of submissions does not constitute acceptance of substitutions except as covered under sub-paragraph entitled "Contract Requests for Substitutions."

44.5. Submittal Review Period: The Contractor shall transmit, to the COTR, all submittals sufficiently in advance of the time necessary for fabrication and installation to allow for review by the Smithsonian and return to the Contractor, including any time needed for correction and resubmission by the Contractor. The expected time required by the Smithsonian for review of initial submission is 14 calendar days. No extension of the Contract Time will be granted for the Contractor's failure to allow sufficient time for review and processing, including resubmission of items, which initially rejected due to improper submission or non-compliance with the Contract Documents.

44.6. Contractor Requests for Substitutions: Contractor requests for items identified by manufacturer, brand name, make, catalog number, etc. in the contract documents shall be submitted to the Contracting Officer for approval prior to contract award, in accordance with the General Conditions. After award of the contract, contractor requests for substitutions may be considered and accepted by the Smithsonian at the discretion of the Contracting Officer.

45. CRITERIA FOR PRODUCT SELECTION

45.1. To the greatest extent possible, subject to the restrictions of the Buy American Act, provide products, materials or equipment of a singular generic kind from a single source. Where more than one choice of a product or material is available for Contractor's selection, select an option, which is compatible with other products and materials already selected.

45.2. Provide products complete with accessories, trim, finish, safety guards and other devices and details needed for complete installation for intended use and effect.

45.3. Products, which, by nature of their application, are likely to be needed at a later date for maintenance and repair or replacement work, shall be current models for which replacement parts are available.

45.4. Product selection shall be done in accordance with the following requirements:

45.4.1. Standards, Codes and Regulations: Select from among products that are in compliance with the project requirements, as well as with construction standards, all applicable codes and regulations and LEED requirements.

45.4.2. Performance Requirements: Provide products that comply with specific performances indicated and are recommended by the manufacturer (in published product literature or by individual certification) for the application indicated.

45.4.3. Prescriptive Requirements: Provide products that have been produced in accordance with prescriptive requirements, using specified ingredients and components and complying with specified requirements for mixing, fabricating, curing, finishing, testing and other operations in the manufacturing process.

45.4.4. Visual Matching: Where matching with an established sample for color, pattern and/or texture, the COTR shall determine whether a proposed product matches the sample.

45.4.5. Avoidance of banned materials: The Contractor will commit to not using the following toxic and hazardous materials:

45.4.5.1. Products containing asbestos, urea formaldehyde, polychlorinated biphenyls (PCBs) and/or chlorinated fluorocarbons;

45.4.5.2. Products containing lead content, including older or flux containing more than 0.2 percent lead; domestic water pipe or pipe fittings containing more than 8 percent lead; and paint containing more than 0.06 percent lead.

46. PROGRESS PHOTOGRAPHS

46.1. The Contractor shall provide photographs of the project site and construction activities throughout the progress of the Work, produced by a commercial photographer, acceptable to the Smithsonian Institution. The COTR shall determine the vantage points from which photographs will be taken.

46.2. At least 24 color progress photographs shall be taken monthly. The actual number and location of views shall be directed by the COTR. Photographs shall be taken at the start and finish of various elements of construction designated by the COTR.

46.3. Within ten (10) working days of taking photographs, the Contractor shall submit to the COTR, via email or other electronic means, JPEG files for all photographs taken. The COTR will select twelve (12) images for electronic "prints" to be made. Prints may be in JPEG or PDF format.

46.4. On the front of each print provide, by photographic means, an information box (40 mm by 90 mm) in the lower right hand corner. The box shall be typewritten and arranged as follows:

Smithsonian Institution
Title: NMNH Repair to the Main Building Exterior &
Provide Blast Protection & Repair Building Windows
OPDC Project No.: 2200106 & 2200107 Contract No.:
Contractor: _____
Photo No.: _____ Date: _____ Time: _____
Description/View: _____

46.5. Submit all original images, select labeled images and typed index to COTR on flash drive or via electronic transfer.

46.6. Negatives, contact sheets and photographs, including the copyright thereto, are the sole property of the Smithsonian Institution and shall be submitted to the COTR before Final Payment processing. The Contractor shall not use Smithsonian property except as authorized in writing by the Contracting Officer.

47. CONTRACTOR CORRESPONDENCE AND DAILY REPORTS

47.1. The Contractor shall correspond with the COTR for all matters related to this construction project, unless otherwise directed. All correspondence shall be signed and dated by the Contractor and shall reference the project, project number and contract number.

47.2. The Contractor shall maintain daily reports using the Smithsonian Institution Contractor's Daily Report form. Reports shall be numbered consecutively and all sections shall be completed or noted as "not applicable." Reports shall contain detailed remarks each day, including but not limited to progress on the job, problems discovered and discussions with Smithsonian staff. Reports shall be submitted to the COTR each day for the previous workday.

47.3. All correspondence with the Smithsonian Institution shall be in the English language.

SAFETY, HEALTH AND FIRE PROTECTION

48. JOBSITE SAFETY

48.1. Safety Coordinator: The Contractor shall designate a person responsible for safety at the project site for the duration of the project.

48.2. Jobsite Safety Plan: The Contractor shall submit a Jobsite Safety Plan within 30 calendar days of the Contract Award and at least 10 calendar days prior to mobilization to the site for approval by the COTR. As a minimum, the plan shall detail the procedures, designated persons, instructions and reports to be used to assure jobsite safety for all contractors, subcontractors, Smithsonian personnel, the public and others on the site.

48.3. Occupational Safety and Health: This contract is subject to Title 29 of the Code of Federal Regulations, Part 1910 "Occupational Safety and Health Standards" and Part 1926 "Safety and Health Regulations for Construction" pursuant to the Occupational Safety and Health Act (OSHA) of 1970 administered by the US Department of Labor, Occupational Safety and Health Administration.

48.4. Emergency Assistance: The Contractor shall post, at the site, telephone numbers for reporting emergencies, including the Smithsonian Office of Protection Services (OPS), ambulance, police, fire department, gas utility, electric utility, water/sewer utility, poison prevention aid and hazardous-waste handling. This information shall be posted in a conspicuous location within the project area prior to the start of any work at the site.

48.5. Safety Signs:The Contractor shall post legible accident prevention signs in construction areas in accordance with OSHA standards. Safety signs shall conform to ANSI 235.1 and 235.2 Vehicular traffic control devices, barricades and signals shall conform to ANSI D6.1.

48.6. Report of Accident or Illness:In the event of any accident or illness for which medical assistance is required, any criminal action or any fire, the Contractor shall notify the appropriate authority (Ambulance, Police, Fire Dept.), Smithsonian Security and the COTR.

48.7. Emergency Evacuation:The Contractor shall post evacuation routes and facility emergency/self-protection plans at the site, train all employees in emergency procedures and document such training. In the event of a fire, the Contractor shall immediately activate the alarm at the nearest fire alarm pull station and notify building security. Upon the activation of the audible alarm, the building will be evacuated. No personnel shall reenter the facility until security personnel signal that the building is safe.

48.8. Contractor Personnel to be Contacted: The Contractor shall submit a written list of emergency telephone numbers and names of persons to contact for the General Contractor superintendent and for each major sub-contractor working on the project site. The initial list shall be submitted to the COTR at the Preconstruction Meeting. The list shall be updated and resubmitted to the COTR as needed.

49. TOXIC AND HAZARDOUS SUBSTANCES

49.1. The Contractor shall submit to the COTR for approval, at least ten (10) working days prior to their intended use, a written list of toxic and hazardous substances that will be used on the project. The Contractor shall submit a "Material Safety Data Sheet" similar to OSHA Form No. 20 for these substances to identify the following information:

- 49.1.1. Product Identification;
- 49.1.2. Hazardous Ingredients;
- 49.1.3. Physical Data;
- 49.1.4. Fire and Explosion Hazard Data;
- 49.1.5. Health Hazard Data;
- 49.1.6. Emergency and First Aid Procedures;
- 49.1.7. Reactivity Data;
- 49.1.8. Spill or Leak Procedures;
- 49.1.9. Special Protection Information;
- 49.1.10. Special Precautions;
- 49.1.11. Volatile Organic Compound (VOC) Content.

49.2. The Contractor shall monitor the use of all toxic and hazardous substances to ensure that exposure to their workers from airborne concentration of, or physical contact with, these substances does not exceed applicable regulatory worker health and safety exposure limits.

49.3. The Contractor shall monitor the use of all toxic and hazardous substances to ensure that exposure to Smithsonian Institution employees and visitors from airborne concentrations of, or physical contact with, these substances is maintained as low as reasonably achievable. Under no circumstances shall exposure exceed the established Short-Term Exposure Limit or 50% of the established Threshold Limit Values or Permissible Exposure Limits (whichever is less) as specified in either:

49.3.1. "Threshold Limit Values and Biological Exposure Indices" of the American Conference of Governmental Industrial Hygienists, latest revision or

49.3.2. Title 29 CFR Part 1910, Subpart Z - "Toxic and Hazardous Substances" of the Occupational Safety and Health Standards, latest revision.

49.4. The Contractor shall provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations. The removal of contaminated waste shall be in compliance with applicable laws and regulations.

49.5. To achieve compliance with the requirements of this section, administration or engineering controls shall first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep exposure of all persons within the prescribed limits. Descriptions of equipment or technical measures to be used for this purpose must be submitted to the COTR for approval. The Contractor's requirements for compliance with all applicable Local, Federal and State regulations remain in force.

49.6. The SI may reject any product that poses a high risk of fire or health hazard to staff, visitors or the building, based on flammability criteria (e.g. low flashpoint) or established toxicity data (e.g. designation as a human carcinogen).

49.7. The Contractor shall submit, to the COTR, a list of the hazardous materials to be stored on site and the manner in which they will be stored. All containers and storage cabinets shall be approved by the COTR and labeled as to hazard and content.

49.8. The SI has made every effort to identify and to notify the Contractor of hazardous materials that may be encountered during the work. However, if suspected asbestos-containing material, lead-based paint or other suspected hazardous materials are encountered during demolition or other phases of the work, the work involving the suspected material shall cease and the Contractor shall notify the COTR immediately.

50. PERSONAL PROTECTIVE EQUIPMENT

50.1. Personal protective equipment for eyes, face, ears, nose, head, extremities and/or full body shall be provided, used and properly maintained by the Contractor whenever necessitated by reasons of hazards encountered in a manner capable of causing illness, injury or impairment in the function of any part of the body.

50.2. Persons required to use personal protective equipment shall be thoroughly trained. Training programs shall, as a minimum, meet OSHA and EPA requirements where applicable. The Contractor shall submit proof and criteria for employee training as requested.

51. BARRICADES, BARRIERS AND WALKWAYS

51.1. The Contractor shall provide safety barricades in accordance with the District of Columbia Building Code and applicable OSHA regulations. The Contractor shall also provide barricades, subject to approval by the COTR, to deter passage of persons and/or vehicles into construction areas as specified or necessary.

51.2. The Contractor shall install temporary barriers, in a manner satisfactory to the COTR, to contain and secure the site from unauthorized entry and to minimize the adverse affects of noise, dust and vapors generated by construction activities on surrounding areas. Barriers shall be constructed of pressure-impregnated fire-retardant treated wood, with fire-retardant 6-mil polyethylene as necessary. Submit all product data to the COTR for review and approval.

51.3. If the work interferes with public or employee access to the facility or parts of the facility, as determined by the COTR, the Contractor shall provide personnel barriers and signage to create easily identifiable, accessible (to people with handicaps) walkways around the work. Signs shall be posted at decision points to prevent unnecessary travel along changed routes and to dead ends. The barriers shall be erected and dismantled in phases so that a clear route is always available. The COTR and Contractor personnel shall have access through the barriers to the work areas. The Contractor may use hardware on the barrier doors to prevent entry by unauthorized persons.

51.3.1. Interior barriers shall be of standard drywall partition construction, painted and terminated at the underside the existing ceilings. All requirements for fire protection shall be maintained.

51.3.2. Exterior barriers shall be of dimensional lumber and plywood, painted on both sides and supported to prevent overturning. Barriers shall be repainted and maintained as necessary to remain in good condition as long as they are required.

51.4. Unless specifically indicated otherwise, barricades, barriers and associated signs shall be removed upon completion of the Work. The Contractor shall coordinate the dismantling and removal with the COTR.

51.5 No entrances, egress routes, Fire Department Connections (FDCs), or other emergency services shall be impacted by scaffolding, material, or work activities when the building is occupied.

51.5.1 See also National Museum of Natural History Life Safety Master Plan, Appendix D Sheets AL-103 and AL-104 for detailed egress route information and exit locations.

52. EXISTING FIRE PROTECTION SYSTEMS

52.1. During the course of the Work, all existing smoke and heat detectors and sprinkler heads are to remain operable to the maximum extent possible. Where specific work will or may adversely affect these devices, coverings shall be applied to protect them from dust, paint overspray or other hazardous conditions for the duration of each task. Written permission shall be obtained in advance of work from the COTR. A qualified person shall remain on site during operations while heads are covered. Coverings must be removed immediately after the operations have concluded for that day. Damaged detectors and sprinkler heads shall be replaced immediately by the Contractor at no additional cost to the Smithsonian Institution. The Contractor shall use accepted procedures to test replaced detectors and sprinklers after installation to the satisfaction of the COTR.

52.2 If a fire protection or life safety system must be impaired for modifications or adjustments during the project, the Contractor shall obtain a daily "Fire System Impairment Permit." Each permit must be obtained at least two (2) working days in advance from the Building Managers Office and be posted at the jobsite prior to beginning the scheduled work.

SECURITY REQUIREMENTS

53. GENERAL SECURITY REQUIREMENTS

53.1. The Contractor and his employees must comply with security requirements imposed by the Smithsonian Institution, including any necessary security clearances. Failure to inspect the site or obtain knowledge of security regulations shall not relieve the Contractor from security requirements or from performance of any part of the work.

53.2. Prior to the start of work on the site, the Contractor shall submit, to the COTR for approval, a list of the names, social security numbers and addresses of all employees and subcontractor employees. The list shall identify the Prime Contractor and each subcontractor and trade. It shall be updated, as necessary, to accurately identify all workers who will be working on the site during the project.

53.3. The name and telephone number of the Contractor's Superintendent and authorized alternate individual who can be reached on a 24-hour basis shall be provided to the COTR at the Preconstruction Meeting.

54. IDENTIFICATION BADGES

54.1. Controlled Access: Contractor employees shall sign in and out with the security officer on a daily basis for the duration of the Contract Time. Access to the building will be granted only to Contractor employees who sign the Building Entry and Departure Register at designated entrances and who wear a Contractor Identification Badge or Day Pass in plain view for inspection. Photo identification badges with serial numbers and information about allowed access may be issued by the Smithsonian to some Contractor employees.

54.2. ID Processing: Contractor personnel will be issued identification badges for use while on the premises.

54.2.1. ID badges will be provided by the Smithsonian at no cost to the Contractor. Smithsonian reserves the right to not issue ID badges to those Contractor employees who fail to meet security requirements.

54.2.2. The Contractor shall submit, to the COTR, a written request for approval of each employee who will be working on site and was not on the original list. Each application must be submitted at least five (5) working days before the employee is scheduled to begin on the project.

54.2.3. After obtaining a temporary official Smithsonian Institution identification badge, contractor personnel will be issued an MSC photo identification badge. The Contractor shall submit an application, SI Form 3513, for each contractor employee that will be working on site. Contractor employees not in possession of an MSC photo will be admitted to the facility only if an authorized MSC staff member approves the issuance of a day pass. Smithsonian cannot guarantee access for persons without an MSC photo badge.

54.3. ID Pickup: Contractors personnel reporting for work shall be required to sign the building entry and departure register and to exchange a driver's license or some other photo identification for the Contractor Identification Badge or Day Pass. The personal identification exchanged for the badge or pass will only be returned to its owner when the credential is returned.

54.4. Accountability for ID: Contractors who are issued an identification badge or day pass are strictly accountable for it and for following established access control procedures. Misuse of the credential, noncompliance with access control procedures or failure to return the ID badge or day pass upon leaving the premises shall be reported to the COTR.

54.5. Lost ID: If a Contractor or subcontractor employee loses an ID badge or day pass, the Contractor shall report the loss immediately to the COTR. The Contractor shall submit to the COTR, within two (2) calendar days, a written report detailing how, where and when the credential was lost. A request to the COTR for authorization of a replacement credential, if necessary, shall accompany this report. The Contractor shall bear the cost for replacement of the lost badge or pass.

54.6. Ownership of ID: The Contractor Identification Badge or Day Pass shall remain the property of the Smithsonian and it shall not be taken off the premises. The badge will be issued to the person it identifies when he reports to the work site for duty and it must be returned to the security guard station whenever the person it identifies leaves the premises.

55. EXISTING SECURITY CAMERAS AND CONDUIT

55.1. Existing security cameras are located on Sheets E101-E104 (OPDC Project No. 2200106).

55.1.1. Protect all security cameras within work zones from any damage or disturbance during work activities.

55.1.2. Do not block or impede visual range of cameras. Coordinate any anticipated service interruption with COTR a minimum of two weeks prior to need. Such service interruption will need to be closely coordinated with building security.

55.2. Any individual or subcontractor working on security cameras or related conduit shall be certified for all relevant building security systems including the following:

55.2.1. Software House

55.2.2. American Dynamics: Victor and Video Edge

55.2.3. BICSI: RCDD

55.3. Existing Security Camera Conduit & Junction Boxes: Replace all existing galvanized EMT conduit and junction boxes servicing security cameras with new stainless steel conduit, junction boxes and associated fittings. 55.3.1 Conduit: New conduit shall be Calibrate ¾" Type 304 Stainless Steel Rigid Conduit or COTR approved equivalent.

55.3.2. Fittings: New couplings, condulets, elbows, clips and related hardware shall be Calibrate Type 304 Stainless Steel or COTR approved equivalent.

55.3.3. Junction Boxes shall be waterproof stainless steel rated for outdoor wet conditions. Boxes shall be NEMA Type 4, 4X, 12, & 13; UL Listed Type 4, 4X, & 12; CSA Type 12, 4, & 4X; IEC 60529 IP 66 5

5.4. CAT 6 Cable: Existing Cat 5 Cables servicing security cameras shall be replaced with new CAT 6 Cables of equivalent length.

55.4.1 New CAT 6 Cable: New cable shall be Enduragain OSP Shielded Cat 6 Cable manufactured by Superior Essex Communications, or COTR approved equivalent.

56. SECURITY OF TEMPORARY OPENINGS

56.1. Any temporary opening in the building perimeter or between non-public and public interior spaces must be closed and secured with means acceptable to the COTR at the end of each workday. A clear and safe path shall be maintained at all times to allow museum visitors entrance into the museums. The Contractor shall secure his facilities and equipment during non-working times at his own expense. Authorized Smithsonian personnel shall have access to the work site.

57. EXISTING BUILDING ALARM SYSTEMS

57.1. The Contractor shall notify the COTR prior to disturbing any alarm wiring, device, system, etc. The Contractor shall coordinate planned disturbances at least two (2) working days in advance of the scheduled work. Any alarm wiring, device or system that is broken or disturbed for any reason must be reported to the Building Manager, COTR and the Building Security Control Room within three(3) minutes of the occurrence.

57.2. If any system or component is damaged by Contractor employees, the Smithsonian Institution Office of Protection Services will determine the procedures for repairing the damage to existing building alarm systems and who will perform the repair work. The cost to repair the system and any related overtime costs for Smithsonian personnel shall be borne by the Contractor.

58. SECURITY GUARD DUTY CHARGES

58.1. If the Contractor is required to accelerate the work in order to complete the project within the specified Contract Time or if other conditions arise as a result of the Contractor's management of the work, which require that construction be accomplished during other than the normal workdays and hours defined for this project, the Contractor will be required to assume the cost of any additional inspection and guard services at overtime rates.

58.2. The current overtime hourly rate charged for each Smithsonian guard will be provided at the Notice to Proceed by the COTR. This rate is subject to change during the Contract Time without notice.

SCHEDULES AND PAYMENTS**59. SCHEDULE OF VALUES**

59.1. The Contractor shall submit, to the COTR, a schedule of estimated values of all parts of the work. The breakdown of costs on the Schedule of Values shall follow the divisions used in the project specifications and shall reflect major items and groups of items shown on the Contractor's project schedule. All values shall be in US dollars.

59.2. Wages: The contractor shall verify wages and comply with regulated wage scales, i.e. Davis-Bacon, Service Contract Act, etc.

60. SCHEDULING & PAYMENTS / BAR CHART

60.1. Project Schedule: The Contractor shall submit to the COTR for approval a Gantt bar chart project schedule within fourteen (14) calendar days after the date of contract award. Submit Project Schedule in both PDF format and original scheduling software format. No work shall start at the site until the project schedule has been approved by the COTR. The approved bar chart will represent a baseline schedule on which the monthly construction progress will be indicated and submitted to the COTR. The baseline project schedule shall comply with the following:

60.1.1. Weekly breakdown of work activities shall be provided, including interaction between building trades, subdivided by items of work and areas of the project. Items of work shall be grouped and subdivided according to the divisions of the Construction Specifications Institute (CSI) format.

60.1.2. The start date and completion date shall be consistent with the Contract Time established by the Contracting Officer. Any intermediate deadline dates needed to meet specific requirements for Smithsonian use of portions of the work shall be shown.

60.1.3. Project condition survey activities shall be scheduled not later than the 14th calendar day of the contract time and prior to the start of any site work.

60.1.4. Project closeout activities shall be scheduled for completion in accordance with the requirements for the Contract Time for Completion.

60.1.5. Order dates and projected delivery dates shall be shown for equipment, special devices, hardware, products or other items requiring long lead-time.

60.1.6. Required delivery dates for items to be furnished by Smithsonian and installed by the Contractor shall be shown, as well as items to be furnished and installed by Smithsonian, which will affect the Contractor's work.

60.1.7. Review periods for all submittals and time required for all necessary inspection and/or testing shall be shown.

60.1.8. Dates shall be given for ordering, delivery, installation and testing of major equipment and special materials and equipment.

60.1.9. The Contractor shall specifically identify work activities and dates associated with construction options.

60.2. Revisions to Baseline Schedules: The Contractor shall submit, to the COTR for approval, all revisions to the approved baseline project schedule. The Contractor shall submit a proposed revision to the schedule as necessary along with proposals for

construction changes, clearly indicating modifications to the schedule based on the proposal. The Contractor shall also submit, for review and approval, any proposed changes to the schedule due to inability to accomplish the work as planned, for any reason. Approved changes to the schedule shall be incorporated into the Project Schedule and it shall be resubmitted as necessary or as requested by the COTR.

60.3. Progress Behind Schedule: If it becomes apparent to the COTR that the overall progress of the project is behind the approved project schedule, then the COTR will notify the Contractor in writing. The Contractor shall submit to the COTR for approval a Recovery Schedule and Plan to describe how the Work will be accelerated to meet the Contract Time requirements in accordance with the General Conditions contract clause entitled "Commencement, Prosecution and Completion of the Work." The Recovery Schedule shall be superimposed on the approved baseline project schedule to demonstrate that proposed recovery activities will accomplish completion of the work by the approved completion date.

60.4. Reporting Progress and Applying for Payment: Each month, the Contractor shall apply for payment and submit a report of the actual construction progress as follows:

60.4.1. By the 25th of each month, the Contractor and the COTR shall have inspected the work to determine percentages complete for each item, projected through the end of the month. The parties shall attempt to reach agreement on each item, but if they cannot reach an agreement the COTR will determine percent complete.

60.4.2. By the last day of the month, the Contractor shall submit an Application for Payment based on the determined percentages complete for each item. The application shall be submitted in triplicate on the Smithsonian standard Application for Payment form. Each copy of the Application for Payment shall be accompanied by the following:

1. A Progress Schedule identifying the cumulative progress superimposed on the latest revision of the approved Project Schedule. The net progress for the month and applicable dates shall be clearly indicated.
2. A complete set of copies of certified weekly-payroll data for the period.

60.5. Response to Application:

60.5.1. Payment shall be made only for progress agreed upon by the COTR, performed on original Contract Work or approved modifications, in accordance with the current, approved Project Schedule. Failure to submit the Application in accordance with the specifications will prevent the processing of payments.

60.5.2. Payments will be mailed to the Contractor's address as identified in the contract documents on record with the Contracting Officer. Any changes of address or requests for wire transfer of progress payments must be made in writing, signed by the Contractor's authorized person and submitted to the Contracting Officer.

61. SCHEDULING & PAYMENTS / CRITICAL PATH METHOD

61.1. CPM Scheduling: The work under this project will be scheduled and reported by the Contractor using the Critical Path Method. Submit Project Schedule in both PDF format and original scheduling software format. The approved Project Schedule(s) shall be used by the Contractor for planning, organizing, executing and directing the work; for monitoring and reporting progress; and for requesting payment for work completed. All costs shall be identified in US dollars.

61.1.1. Order and Inter-Dependence of Activities: The Critical Path Method will be followed to show the order and interdependence of activities and the sequence in which the work is to be accomplished. Each activity shall be tied to all activities that must logically precede or follow it and all paths shall be continuous through to completion date(s).

61.1.2. Work Breakdown Parameters for Activities: The activities shown on the network diagram shall include construction activities, submittal processing by the Contractor, submittal processing by the Smithsonian, procurement activities for major equipment, fabrication of special materials and equipment, installation of special materials and equipment, inspections and tests. All field activities that affect progress toward contractually required dates for completion of all or parts of the Work shall be shown. The level of detail shall be such that the duration of any activity will be no longer than ten (10) working days and no activity will have a dollar value exceeding \$15,000, except as allowed by prior and specific approval of the COTR. All aspects of the contract activities are to be identified and priced accordingly in the proposal. This is to include, but shall not be limited to, separate pricing for bonds, insurance, CQC related work, etc. As-built drawings shall also be priced.

61.1.3. Cost-loading of Activities: The Project Schedule shall include a dollar value (cost) for each work activity. The cost shall include labor, materials, equipment, small tools, incidentals and a prorated portion of overhead and profit. The sum of all activity costs shall be equal to the total Contract Price. Each activity cost shall be coded with a cost code corresponding to a line item on the Schedule of Values.

61.1.4. Computer Software: The Contractor shall use a computerized CPM scheduling software designed for use on IBM personal computers. The name of the software proposed for use shall be submitted to the COTR, along with literature about the program's capabilities, functions and operations, demonstrating that the

requirements of the entire section entitled "Scheduling of the Work / Critical Path Method" can be met.

61.2. Required Schedules: The Contractor shall prepare and submit a Preliminary Project Schedule, Complete Project Schedule, Condensed Summary Schedule, Progress Schedules and Recovery Schedules as described below.

61.2.1. Preliminary Project Schedule: Not later than twenty (20) calendar days after receipt of Notice to Proceed, the Contractor shall submit, for review and approval by the COTR, a Preliminary Project Schedule in time-scaled diagram form, defining in detail the Contractor's planned operations during the first 120 calendar days of the Contract Time. The Contractor shall also provide a time-scaled summary of the general approach for the balance of the project. The requirements set forth under the sub-paragraph entitled "Complete Project Schedule" shall apply to the activities expected to be completed or partially completed during the first 120 calendar days. The Contractor's submission of the Preliminary Project Schedule shall include four (4) copies and one (1) reproducible.

61.2.2. Complete Project Schedule: Within 90 calendar days after receipt of Notice to Proceed, the Complete Project Schedule shall be submitted to the COTR for review and approval. The Contractor's submission of the Preliminary Project Schedule shall include four (4) copies and one (1) reproducible.

61.2.3. Condensed Summary Schedule: Along with each copy of the Complete Project Schedule, the Contractor shall submit, to the COTR for approval, a condensed summary version consisting of not more than 250 activities summarizing major work elements.

61.2.4. Progress Schedules: Each month, the Contractor shall prepare a Progress Schedule by inputting all information regarding actual start and actual finish dates, projected through the end of the month, into the computerized Project Schedule. Complete discussion of this requirement is contained in the section "Reporting Progress and Applying for Payment."

61.2.5. Recovery Schedule: If the work falls substantially behind the approved Project Schedule the COTR may require the Contractor to submit a Recovery Schedule in accordance with the Construction Contract Clauses paragraphs relating to "Commencement, Prosecution and Completion of Work." Upon request, the Contractor shall submit a Recovery Schedule to the COTR for approval within ten (10) working days. The requirements set forth herein in the sub-paragraph entitled "Complete Project Schedule," shall apply to all activities shown on the Recovery Schedule.

61.3. Schedule Preparation: Schedules shall be prepared and submitted as network diagrams with accompanying reports as described below.

61.3.1. Diagram Format: Diagrams shall be submitted on sheets at least 30 inches by 42 inches. Each diagram shall show the date of the latest revision, the initials of the preparer of the diagram and the approval signature of the party authorizing its submission. The Contractor shall also provide the COTR with a copy of the personal computer diskette, tape or other recording device containing the Schedule. Diskettes shall be sized 3.5 inches and formatted for high density, double-sided.

61.3.2. Diagram Content: The following information shall be shown for each activity on the diagrams: preceding and succeeding activities, description of the activity, cost of the activity, craft involved, responsibility and activity duration in calendar days. The critical path shall be determined and shall be clearly indicated on the diagram. Network activity numbers shall be assigned in ascending sequence so that preceding event numbers are smaller than the following event numbers.

61.3.3. Schedule Report Data: Computer-generated reports from the CPM schedule shall be a tabulation of all activities on the network and may include any of the following information for each activity:

1. Activity number;
2. Activity description;
3. Responsibility for activity (Contractor, Subcontractor, Supplier, Smithsonian, etc.);
4. Total monetary value of activity (TV);
5. Total duration in days (TD);
6. Percentage completed (PC);
7. Contractor's earnings-to-date based on percent of activity completed (ETD);
8. Estimated remaining duration in days (RD);
9. Earliest start date, by calendar day (ES);
10. Earliest finish date, by calendar day (EF);
11. Actual start date, by calendar day (AS);
12. Actual finish date, by calendar day (AF);
13. Latest start date, by calendar day (LS);
14. Latest finish date, by calendar day (LF);
15. Total float time (TF);
16. The Work item from the Schedule of Values used for progress payments of which the activity is a part.

61.3.4. Standard CPM Reports: The following standard reports shall list all activities and the indicated data for each activity, sorted and ordered as described. The Contractor shall provide changes to these reports or creation of additional reports as requested by the COTR at any time.

1. Cost Report - sorted by responsibility, ordered by activity numbers (lowest to highest); including activity numbers, activity descriptions, TV, TD, PC, ETD, RD and corresponding item number from the Schedule of Values.
2. Activity Report - in order of activity numbers (lowest to highest); including activity numbers, activity descriptions, TD, PC, RD, ES, EF, AS, AF, LS, LF and TF.
3. Early Start Report - in order of early start dates, further ordered by total float (lowest to highest), then by activity numbers (lowest to highest); including activity numbers, activity descriptions, TD, PC, RD, ES, EF, AS, AF, LS, LF and TF.
4. Total Float Report - in order of the amount of total float (lowest to highest), further ordered by activity numbers (lowest to highest); including activity numbers, activity descriptions, TD, PC, RD, ES, EF, AS, AF, LS, LF and TF; and reflecting all activities having less than ninety (90) working days float.

61.4. Review and Approval of Project Schedules: The Smithsonian will review the Preliminary and Complete Project Schedules within fifteen (15) calendar days after receipt of each. The COTR will then schedule a meeting with the Contractor to review the Schedule and discuss any questions or recommendations the Smithsonian may have. Any revisions required by the COTR shall be submitted for approval within ten (10) calendar days after the review.

61.5. Changes to Project Schedules: During the Contract Period the Project Schedule will be revised and updated to reflect changes to the plan of execution and work progress. Schedule revisions and updates shall be executed and submitted as described below.

61.5.1. Contractor Revisions to Project Schedules: If the execution of the work varies significantly from the Project Schedule or the Contractor desires to make changes to the schedule, the Contractor shall submit a revision of the affected portion to the COTR along with a statement of the reasons for the change. The COTR will review and approve or reject the revision within fifteen (15) calendar days after receipt.

1. If the COTR observes work performed in variation from the approved schedule and considers these changes to be major, the COTR will require

the Contractor to submit for review and approval, without additional cost to the Smithsonian, revision of all of the affected portions of the network diagrams along with standard reports to show the effect on the entire project.

2. A change will be considered major if the COTR determines that the change may impact the contract completion date.

3. Changes, which affect activities with adequate float time, shall be considered minor changes. An accumulation of minor changes will be considered a major change when the cumulative effect modifies the contract completion date. The effect of minor changes on logic shall be shown on each monthly update and described fully in the accompanying narrative report.

61.5.2. Changes Related to Requests for Proposals: For all proposals involving requests for time extensions or other significant changes to schedule, the Contractor shall submit a listing of all the activities affected, added or deleted (by code numbers). The effect in time and money shall be described for each activity. If, in the opinion of the COTR, the proposed change may impact the completion date(s), the Contractor shall submit a diagram of that portion of the network schedule affected by the changes, along with standard reports for analysis.

1. Diagrams and reports submitted to illustrate the impact of a proposed change shall show the necessary revisions to activities, along with their costs, durations and trade responsibilities. Failure to submit such a diagram with a proposal shall constitute a waiver of any claims for time extensions associated with the subject of that proposal.

2. Modification of activity times shall be agreed upon by both the Contractor and the COTR. In the event that agreement on modified activity times cannot be reached, the COTR will direct the specific time adjustments to be entered into the program to determine approved, revised, contract completion dates.

61.6. Scheduling Consultant: The Smithsonian reserves the right to retain a scheduling consultant to assist the Smithsonian in performing the Smithsonian functions under this section and will inform the Contractor of its retention of such a consultant in writing. The Contractor will cooperate with the scheduling consultant by furnishing information contractually required to be furnished to the Smithsonian.

61.7. Reporting Progress and Applying for Payment: Each month, the Contractor shall apply for payment and submit a report of the actual construction progress as follows:

61.7.1. By the 25th of each month, the Contractor and the COTR shall have inspected the work to determine percentages complete for each item, projected

through the end of the month. The parties shall attempt to reach agreement on each item, but if they cannot the COTR will determine percent complete. These percentages shall be input into the latest revision of the Progress Schedule, including all revisions approved to date.

61.7.2. By the last day of the month, the Contractor shall submit an Application for Payment based on the determined percentages complete for each item. The application shall be submitted in triplicate on the Smithsonian standard Application for Payment form. Each copy of the Application for Payment shall be accompanied by the following:

1. A complete set of reports as described in the "Standard CPM Reports" section.
2. A complete set of copies of certified weekly-payroll data for the period.
3. A Change Order Status Report showing the following information for each approved modification and each pending or proposed change: Proposal Number, Modification Number (if applicable), affected activity numbers for each proposal and the approved price for each modification.

61.8. Response to Application:

60.8.1. Payment shall be made only for progress agreed upon by the COTR, performed on original Contract Work or approved modifications, in accordance with the current, approved Project Schedule. Failure to submit the Application in accordance with the specifications will prevent the processing of payments.

61.8.2. Payments will be mailed to the Contractor's address as identified in the contract documents on record with the Contracting Officer. Any changes of address or requests for wire transfer of progress payments must be made in writing, signed by the Contractor's authorized person and submitted to the Contracting Officer.

62. ASSIGNMENT OF CLAIMS

62.1. Assignment of Claims are subject to the approval of the Contracting Officer. Any Assignment of Claim or subsequent re-assignment shall meet the requirements of the General Conditions contract clause entitled "FAR 52.232-23 Assignment of Claims."

62.2. All documents for assignments shall be written in the English language and shall be original ink signatures of the Contractor and assignee. All monies shall be identified in US dollars.

PROJECT CLOSEOUT REQUIREMENTS

63. PROJECT CLOSEOUT

63.1. Definition: Project closeout is a scheduled process for fulfillment of remaining contract requirements at the end of the project in preparation for final acceptance, final payment, normal termination of contract, beneficial occupancy and establishment of the warranty period(s).

64. SUBSTANTIAL COMPLETION

64.1. Definition: The date of Substantial Completion of a project or specified part of a project is the date, as confirmed by inspection by the COTR, when the construction is at least 95% complete and ready for beneficial occupancy, so that the Smithsonian can take possession of that area or part of the work. Portions of the work that are specified to be phased for completion, areas required for Smithsonian's use prior to completion of the total project or items of work identified by the COTR as necessary for partial beneficial occupancy may be inspected for substantial completion separately from the rest of the Work.

64.1.1. The Smithsonian Institution reserves the right to occupy or install equipment in completed areas of the building prior to substantial completion provided that such occupancy does not interfere with the completion of the work. Such partial occupancy shall not constitute acceptance of any part of the work.

64.2. Request for Substantial Completion Inspection: The Contractor shall submit a written request to the COTR for an inspection to establish Substantial Completion status. This request shall specify areas or parts of the work to be considered and shall include a listing of all exceptions to the request, that is, items not considered to be substantially complete.

64.3. Submission of Operation and Maintenance Manuals: Prior to requesting Substantial Completion Inspection, the Contractor shall submit, to the COTR, three (3) sets of manuals for all systems and equipment, as specified in the technical sections of this specification. The manuals shall be bound in letter-sized, three-ring, loose-leaf binders with durable plastic covers. They shall be organized into suitable volumes of manageable size using the divisions of the Specifications as a guide. Each manual shall have a table of contents and shall be assembled to conform to the table of contents with tab sheets locating each subject. The instructions shall be legible and easy to read. Where oversized drawings are necessary, they shall be folded to be not greater than letter-size. The words "Operation and Maintenance Manual," the name and location of the project, project number, contract number, date and the name of the general contractor, shall appear on the cover. Data shall be specific to the equipment that is installed and reflect all approved changes and substitutions. Data shall also reflect any required or recommended seasonal adjustments or inspections. Include electronic copy of manual, in PDF format, on CD/DVD. Manuals shall include, as a minimum, the following data:

- 64.3.1. Detailed description of each system and each of its components, including layout showing piping, valves, controls and other components and including diagrams and illustrations where applicable.
- 64.3.2. Wiring and control diagrams with data to explain detailed operation and control of each component.
- 64.3.3. Control sequence describing start-up, operation and shutdown.
- 64.3.4. Procedures for starting, operating and shutdown.
- 64.3.5. Installation instructions.
- 64.3.6. Maintenance and overhaul instructions.
- 64.3.7. Lubricating schedule, including type, grade, temperature range and frequency.
- 64.3.8. Emergency instructions and safety precautions.
- 64.3.9. On-site acceptance test results for equipment installed under this contract.
- 64.3.10. Approved product data, shop drawings and system as-builts.
- 64.3.11. Copies of approved certifications and laboratory test reports (where applicable).
- 64.3.12. Notarized copies of warranties (originals to be provided as required by "Warranties and Guarantees").
- 64.3.13. Written instructions for test procedures.
- 64.3.14. Performance curves and rating data.
- 64.3.15. Parts list, including source of supply, recommended spare parts and service organization convenient to Smithsonian.
- 64.3.16. Name, address and telephone number of each subcontractor who installed equipment and systems, local representative for each type of equipment and each system.
- 64.3.17. Other pertinent data applicable to the operation and maintenance of particular systems or equipment and/or other data as specified Divisions 2 through 33 of the Specifications.

64.4. Other Prerequisites for Substantial Completion Inspection: The Contractor shall also complete the following prior to requesting inspection for certification of substantial completion:

64.4.1. Testing and start-up of systems.

64.4.2. Installation of all signage, including accessibility related signs, equipment instructions, identification labels and permanent directional signs.

64.4.3. Submission of spare parts, tools and surplus materials as required in technical specifications. Submit to the COTR an MSDS for each surplus material that contains toxic or hazardous substances. Surplus materials that the SI determines not to retain shall be removed and properly disposed of by the Contractor according to all applicable regulations.

64.4.4. Scheduling of training sessions for Smithsonian personnel.

64.4.5. Removal of all waste, rubbish and temporary facilities and services. Means of access to all areas of the work to be inspected by the COTR shall be maintained.

64.4.6. Disposition of samples and mock-ups not incorporated into the work.

64.4.7. Arrangement for permanent utility connections and billing responsibility transfer to Smithsonian's Office of Facilities Operations (OFO).

64.4.8. Arrangement for transfer of security responsibility for the project site and changeover of locks by Smithsonian's Office of Protection Services (OPS).

64.4.9. Hazardous Waste Disposal: Submit copies to the COTR of the following hazardous waste records for hazardous waste generated on SI property and disposed of by contract personnel.

1. Hazardous Waste Manifests
2. Notification and Certification Forms
3. Material Profile Sheet or characterization
4. Container Content Sheets
5. Certificates of Disposal

64.5. Scheduling of the Substantial Completion Inspection: Within seven (7) calendar days after receipt of the Contractor's written request, the COTR will either schedule an inspection or advise the Contractor of work that must be completed or prerequisites that must be met prior to scheduling the Substantial Completion Inspection. In that case, another written request for Substantial Completion Inspection must be submitted when all requirements have been met.

64.6. The Substantial Completion Inspection: The Substantial Completion Inspection will be performed by representatives of the Smithsonian Institution led by the COTR. During the inspection, the COTR will prepare a punch list of deficiencies in the work. If the punch list becomes too extensive the COTR may cancel the inspection and require additional work to be performed for a repeat inspection.

64.6.1. For satisfactory inspection results, the COTR will issue the written punch list to the Contractor as soon as possible after the inspection. Items on the punch list must be completed prior to final acceptance of the total project work.

64.6.2. For unsatisfactory inspection results, the COTR will, within three (3) calendar days, give written notice to the Contractor that the Work or portion of the Work is not substantially complete in accordance with the contract documents and therefore does not meet Substantial Completion status. Requests for re-inspection shall meet all requirements for the original request for Substantial Completion inspection.

64.7. Punch List: Incomplete contract requirements identified during the Substantial Completion Inspection will form an initial basis for a punch list for final acceptance. All punch list items must be completed by the Contractor within the Contract Time. If additional days are needed to complete the punch list items beyond the Contract Time, then the Contractor shall submit, prior to the end of the Contract Time, a written request to the Contracting Officer stating:

64.7.1. Items requiring additional time;

64.7.2. Amount of time needed to complete each item;

64.7.3. Reasons why the items cannot be completed by the contract completion date.

65. FINAL COMPLETION AND ACCEPTANCE

65.1. Definition: The date of final completion of a project is the date, as confirmed by inspection by the COTR, when the Work is satisfactorily completed and accepted in accordance with the contract documents, as amended and/or modified.

65.2. Request for Final Completion Inspection: When all items on the punch list have been corrected to the satisfaction of the COTR and additional requirements as described below have been satisfied, the Contractor shall submit a written request for Final Completion Inspection.

65.3. Prerequisites for Final Completion: Prior to requesting the inspection for certification of Final Completion, the Contractor shall complete the following:

65.3.1. Submission of a copy of a prior punch-list stating that each item has been completed or otherwise resolved for acceptance.

65.3.2. Provision of Instructions to Smithsonian Personnel -where instructions to Smithsonian personnel are specified in other sections, furnish, without additional expense to the Smithsonian, the services of competent instructors, who will give full instruction in the care, adjustment and operation of the systems and equipment to designated Smithsonian employees.

1. Each instructor shall be familiar with all parts of the system on which he or she is to give instruction and shall be knowledgeable about the systems' operation and required maintenance. Factory trained instructors shall be employed wherever practical and available.
2. Unless otherwise required or approved, the instruction shall be given during the regular workweek after the equipment has been accepted and turned over to the Smithsonian for regular operation. Where significant changes or modifications in equipment are made under the terms of the contract, additional instruction shall be provided as may be necessary to acquaint the operating personnel of the changes or modifications. Unless otherwise stated, at least half of the time allocated for instruction shall be "hands-on," using the actual system installed.
3. Upon completion the Contractor shall obtain written acknowledgment from the COTR that the required instruction was completed.

65.3.3. Posting of operating instructions approved by the COTR for each system and each principal piece of equipment. Include wiring and control diagrams showing the complete layout of the entire system including equipment, piping, valves and control sequence framed under clear laminated plastic and posted where directed by the COTR. Printed or engraved operating instructions for each principal piece of equipment including start-up, proper adjustment, operating lubrication, shut-down safety precautions, procedure in the event of equipment failure and any other necessary items of instruction as recommended by the manufacturer of the unit shall be attached to or posted adjacent to the piece of equipment. Operating instructions exposed to the weather or wet or humid conditions shall be made of weather-resisting materials or shall be suitably framed and enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling. The Contractor shall coordinate the location of posted instructions with the COTR.

65.3.4. Provision of equipment demonstrations for each equipment item. The Contractor shall coordinate scheduling of all demonstrations through the COTR.

65.3.5. Submission of original warranties for all products, equipment and systems.

1. The Contractor shall assemble original warranty certificates or notarized copies of warranty certificates executed by the Contractor, Subcontractors, suppliers and manufacturers in a tab-indexed, three-ring loose-leaf binder with a durable plastic cover. Provide electronic copy, in PDF format, on CD. The table of contents shall identify the item covered, the location of the item, the date of Substantial Completion, expiration date of the warranty and the supplier, vendor and installing contractor. Duplicate notarized copies of warranties shall be provided as required by "Manuals for Operation, Maintenance and As-Built Product Data."
2. Each warranty certificate or bond shall identify the date(s) for:
 - (1) Substantial Completion status in accordance with project closeout requirements.
 - (2) Beginning and ending of the warranty period.
 - (3) The Contractor shall provide any coincidental product warranty, which is available on a product incorporated in the Work, but for which the warranty is not specifically required by the contract documents.
3. Warranty of Construction: The Contractor shall warrant that the work performed under this contract conforms to the contract requirements and is free of any defect in equipment, materials, design furnished or workmanship performed by the Contractor or any subcontractor or supplier at any tier. Unless otherwise stated in the technical sections of the Specifications, the warranty of the Work shall continue for a period of one (1) year from the date of Final Completion status. If the Smithsonian takes partial occupancy before Final Completion, then the warranty for that portion shall be in effect for a period of one (1) year beginning on the date of Substantial Completion for that portion of the Work.

65.3.6. Submission of construction progress photographs and negatives, property survey and similar final record information.

65.3.7. Arrangement for changeover locks through the COTR and Smithsonian Office of Protection Services as required for security for Smithsonian occupancy.

65.3.8. Submission of evidence of payment and transfer date of utility company accounts for those utilities previously billed to the Contractor during construction, as necessary.

65.3.9. Submission of evidence that all regulatory agency permit and code requirements have been completed and recorded, as necessary.

65.3.10. Submission of a signed, written statement that no damage has occurred to the site as documented by the pre-condition survey report.

65.3.11. Final clean up, including:

1. Sweep and dust all surfaces and wash all finished surfaces to appear new and free of all stains, soil marks, dirt and other forms of defacement.
2. Remove labels that are not required as permanent labels.
3. Clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances that are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
4. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of dust stains, films and similar noticeable substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
5. Wipe surfaces of equipment clean. Remove excess lubrication and other substances.
6. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
7. Wet-mop concrete and clean other hard-surface floors according to manufacturers' recommendations.
8. Vacuum clean carpeted surfaces and similar soft surfaces.
9. Clean plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.
10. Clean project site (yard and grounds) of litter and foreign substances. Sweep exterior paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits. Rake grounds, which are neither planted nor paved, to a smooth, even textured surface.

65.4. Inspection of the Work for Final Completion: Upon receipt of the Contractor's written notice that the work has been completed, the COTR will inspect the work to confirm Final Completion status and acceptance of the work. As soon as possible after inspection,

the COTR will either provide written acknowledgment of final acceptance or advise the Contractor of work not completed or obligations not fulfilled as required for final completion and acceptance.

65.5. Application for Final Payment:

64.5.1. Application for Final Payment shall be submitted only after Final Acceptance has been certified in writing to the Contractor by the COTR. Application shall include final labor data and progress schedule update.

64.5.2. Final Payment will be approved when Final Acceptance has been certified and the following conditions have been met:

- a. Certification signed and submitted by the Contractor that all contract requirements, including contract modifications, have been met.
- b. Final Release of Claims submitted.
- c. Release of assignment of claims or consent of surety submitted, as necessary.
- d. All security ID badges and parking permits returned to Smithsonian.
- e. As-Built Record Drawings Submitted: During the progress of the work the Contractor shall maintain a complete and up-to-date set of record prints, open to inspection by the COTR at any time. These prints shall provide a complete and accurate as-built record of all changes to the Contract Drawings, including rerouting of runs, relocation of items or control points and all other modifications. The exact location of pipes, conduit or other features concealed underground, under concrete, in chases or above ceilings shall be shown by perpendicular dimensions from at least two available landmarks. As-built drawings shall be neatly marked with colored pencils or ink, marked "As-Built" and signed and dated by the Contractor. Upon completion of the Work and before final payment, the Contractor shall submit the following to the COTR: photographically produced as-built record drawings on 4-mil, double matte, mylar sheets, sized the same as the contract drawings; electronic copies of as-built record drawings in PDF and DWG formats.
- f. As-Built Record Survey of Underground Utilities Submitted: If outside or underground utilities are part of the work, the Contractor shall furnish, to the COTR for approval, an acceptable and accurately dimensioned survey showing location and elevation of underground storage tanks, all utility lines for water, gas, electrical, sewer, steam, etc., including valves, connections and changes in direction, as installed under the contract, within the property lines and outside the building walls.

Points where utility lines emerge from the building shall be located from lot monuments. The survey shall be made to scale and must be marked "As-Built" and signed and dated by the Contractor. The Contractor shall furnish a scanned, digital copy to the COTR as well as a copy on a 3-mil, double matte, mylar sheet or sheets the same size as the contract drawings.

g. As-Built Record Specifications Submitted: The Contractor shall submit one (1) hard copy and one digital (scanned) set of project specifications with annotations to identify any changes made during construction, referencing modification numbers, dates and originators of authorizing letters or memos and other sources of changes. The cover shall be marked "As-Built" and signed and dated by the Contractor.

h. Close-out Conditions Text and Photographic Documentation Submitted: The Contractor shall prepare a typewritten text and photographic report of observations made during the inspections for project closeout regarding conditions of new work and adjacent items that were examined for the pre-condition survey report. Any defects shall be identified and the Contractor's operations on the defect shall be described. Within ten (10) calendar days after the Final Inspection, the Contractor shall submit the text and photographic report in PDF format to the Contracting Officer and the COTR and retain a copy of each for the Contractor's files.

. Final Videotape Documentation Submitted: The Contractor shall employ a professional photographer to prepare a videotape with audio narrative of the observations made during the inspections for project closeout. Videotape shall include work completed under the project and items examined for the pre-condition survey report. The Contractor shall make the video record in digital and in triplicate copy. Within ten (10) calendar days after the Final Inspection, the Contractor shall submit the digital file and one (1) copy to the Contracting Officer, the digital file and one (1) copy to the COTR and retain the digital file and one (1) copy for the Contractor's files.

END OF SUPPLEMENTARY CONDITIONS FOR CONSTRUCTION

SECTION 01 3591 - HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general protection and treatment procedures for designated spaces, areas, rooms, and surfaces in Project.
- B. Related Requirements:
 - 1. Section 01 0000 "Supplementary Conditions for Construction" for restrictions on use of the premises, and protection of the site (grounds and building).

1.2 DEFINITIONS

- A. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- B. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- C. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
- D. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- E. Replace: To remove, duplicate, and install entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- F. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- G. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- H. Restore: To replicate, reproduce, repair, and refinish as required to achieve the indicated results.
- I. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.
- J. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.

1.3 COORDINATION

- A. Historic Treatment Subschedule: A construction schedule coordinating the sequencing and scheduling of historic treatment work for entire Project, including each activity to be performed; and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for historic treatment work.
 - 1. Schedule construction operations in sequence required to obtain best historic treatment results.
 - 2. Coordinate sequence of historic treatment work activities to accommodate the following:
 - a. Other known work in progress.
 - b. Tests and inspections.
 - 3. Detail sequence of historic treatment work, with start and end dates.
 - 4. Use of elevator and stairs.
 - 5. Include recurring Historic Preservation Construction Progress Meetings.

1.4 PROJECT MEETINGS FOR HISTORIC TREATMENT

- A. Preliminary Historic Treatment Conference: Before starting historic treatment work, conduct conference at Project site.
 - 1. Attendees: In addition to representatives of COTR, Architect, and Contractor, testing service representative, historic treatment specialists, chemical-cleaner manufacturer(s), and installers whose work interfaces with or affects historic treatment shall be represented at the meeting.
 - 2. Agenda: Discuss items of significance that could affect progress of historic treatment work, including review of the following:
 - a. Historic Treatment Subschedule: Discuss and finalize; verify availability of materials, historic treatment specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Fire-prevention plan.
 - c. Governing regulations.
 - d. Areas where existing construction is to remain and the required protection to be provided by Contractor.
 - e. Hauling routes.
 - f. Sequence of historic treatment work operations.
 - g. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
 - h. Qualifications of personnel assigned to historic treatment work and assigned duties.
 - i. Requirements for extent and quality of work, tolerances, and required clearances.
 - j. Methods and procedures related to historic treatments, including product manufacturers' written instructions and precautions regarding historic

- treatment procedures and their effects on materials, components, and vegetation.
- k. Embedded work such as flashings and lintels, special details, collection of wastes, protection of occupants and the public, and condition of other construction that affect the Work or will affect the work.
3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.
- B. Coordination Meetings: Conduct specifically for historic treatment work at monthly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each historic treatment specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of historic treatment work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to historic treatment work.
 2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of historic treatment work. Include topics for discussion as appropriate to status of Project.
 - a. Historic Treatment Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
 - b. Schedule Updating: Revise Contractor's Historic Treatment Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each entity present, including review items listed in the "Preliminary Historic Treatment Conference" Paragraph in this article and the following:
 - 1) Interface requirements of historic treatment work with other Project Work.
 - 2) Status of submittals for historic treatment work.
 - 3) Access to historic treatment work.
 - 4) Fire-prevention plan.
 - 5) Quality and work standards of historic treatment work.
 - 6) Change Orders for historic treatment work.
 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.5 INFORMATIONAL SUBMITTALS

A. Historic Treatment Subschedule:

1. Submit historic treatment subschedule within seven days of date established for commencement of selective removals work.
2. Include list of historic items indicated on Drawings to be protected in place.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations.

C. Historic Treatment Program: Submit 30 days before work begins.

1.6 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: An experienced firm regularly engaged in historic treatments similar in nature, materials, design, and extent to the work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.

1. Recent projects must be on buildings listed, or eligible to be listed, in the National Register of Historic Places, and under the direction of preservation authorities.
2. Historic Treatment Specialist Foreman: Full-time foreman with experience equal to or greater than that required of Specialist Firm. Foreman shall read and speak English fluently.
3. Mechanics: Work on historic building fabric shall be carried out by skilled mechanics, under the supervision of the Historic Treatment Specialist Foreman, who are thoroughly trained and experienced in the type of work being performed on the types of elements, materials, and finishes on which the work is being performed and who have a minimum of three years' experience performing similar work on elements, materials, and finishes of historic buildings.

B. Historic Treatment Program: Prepare a written plan for historic treatment for whole Project, including protection of surrounding materials during operations and in-place protection of items indicated on Drawings. Describe in detail the materials, methods, and equipment to be used. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project historic treatment program with specific requirements of programs required in other historic treatment Sections.

1. Coordinate Historic Treatment Program with the COTR.

1.7 STORAGE AND HANDLING OF HISTORIC MATERIALS

A. Identification: Photograph, tag, and catalog items to be protected in place, salvaged for delivery to Owner, or salvaged for reinstallation.

1. Identify each salvaged item with a nonpermanent location identification tag indicating item name or use, location, and location identification number to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying tag.
 - a. For groups of material, such as masonry, provide location identification tag for pallet or container. Do not tag individually.
 - B. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work.
- 1.8 FIELD CONDITIONS
- A. Size Limitations: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.
 1. Use only proven protection methods, appropriate to each area and surface being protected.
 2. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
- B. Temporary Protection of In-Place Materials:
 1. Protect existing materials indicated on Drawings, with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 2. Do not attach temporary protection to historic surfaces except as approved in writing by Architect.
- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on adjacent materials.
- D. Existing Exterior Drains: Prior to the start of work in an area, test exterior drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as stone or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 GENERAL HISTORIC TREATMENT

- A. Have historic treatment work performed only by qualified historic treatment specialists.
- B. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.
- C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs or video recordings. Comply with requirements in Section 01 0000 "Supplementary Conditions for Construction."
- D. Perform regular inspections of Project site as the Work progresses to detect hazards resulting from historic treatment procedures.
- E. Follow the procedures in subparagraphs below and procedures approved in historic treatment program unless otherwise indicated:
 1. Retain as much existing material as possible; repair rather than replace.
 2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
 3. Use reversible processes wherever possible.
 4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
- F. Where missing features are indicated to be repaired or replaced, provide work with appearance based on accurate duplications rather than on conjecture, subject to approval of Architect.
 1. In related technical Sections, include field-verified dimensions and the following:
 - a. Full-size shapes and profiles with complete dimension for replacement components and their joints, showing relationship of existing components to new components.
- G. Where work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

END OF SECTION 01 3591

SECTION 04 0140.62 – MASONRY REPOINTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- B. Section includes repointing of stone masonry as follows:
 - 1. Perform and provide all submittals, surveys, shop drawings, and mockups as identified in this section.
 - 2. Localized repointing (cutting and filling with mortar) of joints in the exterior granite walls, cornices, and projections as indicated on the Drawings (shown as an overall percentage of mortar joints to be repointed).
- C. Other Sections of these Specifications that relate to the work of this Section include the following:
 - 1. Section 01 3591.01 – Historic Treatment Procedures.
 - 2. Section 04 0140.52 – Stone Cleaning.
 - 3. Section 04 0140.92 – Stone Restoration
 - 4. Section 07 0190.81 – Joint Sealant Replacement
 - 5. Section 07 6000.00 – Flashing and Sheet Metal

1.3 REFERENCES

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.4 UNIT PRICES

- A. Unit prices apply to authorized work covered by estimated quantities. Unit prices apply to additions to and deletions from work as authorized by Change Orders.
- B. All quantities listed on the Drawings are approximate. Contractor pricing is to reflect quantities listed on the Drawings. Include the cost of repointing in unit prices as requested by the Contract Documents.
- C. See Division 1, Section 5 for Schedule of Unit Prices

1.5 REFERENCE STANDARDS

- A. In general, follow all requirements, recommendations, and procedures of the following standards and publications, except where these Contract Documents are more stringent.

1. Smithsonian Directive 418, Smithsonian Institution Historic Preservation Policy.
2. National Park Service, Preservation Brief #2, "Repointing Mortar Joints in Historic Masonry Buildings."
3. Secretary of the Interior's Standards for the Treatment of Historic Properties.
4. ACI 530 – Building Code Requirements for Masonry Structures.
5. American Society of Testing and Materials (ASTM): Standards as specified or referenced herein.
6. Product manufacturer's written instructions and recommendations.
7. American Society for Testing and Materials (ASTM):
 - a. C144-18, Standard Specification for Aggregate for Masonry Mortar
 - b. C150, Standard Specification for Portland Cement
 - c. C207 Standard Specification for Hydrated Lime
 - d. C270-19 Standard Specification for Mortar for Unit Masonry
 - e. C1324 Standard Specification for Examination and Analysis of Hardened Masonry Mortar
 - f. C1713 Specification for Mortars for the Repair of Historic Masonry

1.6 DEFINITIONS

- A. In-situ Mortar: Existing mortar, including original and subsequently installed mortar.

1.7 SUBMITTALS

- A. Preconstruction and Construction photographs: Provide clear before and after photos of each work area once access is set up. Provide photos on a weekly basis as work progresses.
- B. Contractor qualifications. Provide subcontractor qualifications as required under Quality Assurance.
- C. Submit the following items from the manufacturer.
1. Submit a current copy of the pertinent referenced standards.
 2. Manufacturer's installation recommendations. Include the instructions and recommendations for all phases of work, including preparation of substrate, application of materials, weather limitations, and protection of installed material.
 3. Submit the manufacturer's product data and Safety Data Sheets (S.D.S.) for each product indicated.
 4. Any warranty information provided by the manufacturer.
 5. Submit a statement from the manufacturer that product(s) to be used will be compatible with the different types of masonry surfaces where they will be used and that the material and process will not be in conflict with other products that will be used during the Work.
- D. Submit a schedule of work for approval by the COTR.
- E. Field Existing Condition Survey: Prior to completing masonry repointing, survey all existing masonry within the area of work to recommend to the COTR suggested locations of repointing. Annotate elevations with areas requiring more or less repointing than what is indicated on the Drawings.

- F. Mortar Mix Design: The Contractor shall warrant by the submission of the design mixes that such mixes are representative of the mortar that the Contractor intends to supply to meet the requirements of the Contract Documents. Submit new design mixes for review and approval when any change in materials is required or needed.
- G. Mortar Analysis: Provide a new mortar analysis of original undisturbed mortar. Analysis should be conducted by a reputable third-party architectural conservator or lab specializing in the analysis of historic mortars. Analysis should include both acid digestion and petrographic analysis of mortars in accordance with ASTM C1324. Acceptable labs include Schnabel Conservation, 110 Kensington Ave, Trenton, NJ 08618, Highbridge Materials Consulting, 404 Irvington St, Pleasantville, NY 10570, or equivalent approved by COTR.
- H. Mortar Mix: Basis of Design: Previous projects have used both a Type K and a Type N mortar mix using specified products. Assume the new mix design will be a Type N mortar based on one part white and gray Portland cement; 1 part lime; and 6 parts sand. The proportion of white to gray Portland can be adjusted to achieve correct color.
- I. Samples: Submit the following samples to the COTR for review. Samples must be approved before any repointing mockups are completed.
 - 1. Repointing Mortar Samples: Provide samples of the cured mortar proposed to be used for repointing for mixes listed in Section 2.2. Samples will be used to evaluate the color and texture of the mortar and will be compared to the original mortar in place on the building. Along with physical samples, submit tables showing the mix design ("recipe") for each, listing all materials specifically, including the particular manufacturer and product name.

1.8 MOCKUPS

- A. Prepare field samples for restoration methods to demonstrate aesthetic effects and quality of materials and execution. Use materials and methods proposed for completed Work and prepare samples under the same weather conditions to be expected during the remainder of Work.
 - 1. Locate mockups on the building where directed by the COTR.
 - 2. Notify COTR 7 days in advance of the dates and times when samples will be prepared.
 - 3. The Contractor shall prepare sample installations for repointing types indicated. Panels should be chosen in discrete locations to represent the conditions of the building as a whole.
 - 4. Sample installations will serve to determine the time required for project completion and the suitability of materials used and shall be prepared by the person who will be installing them on the Project
 - 5. COTR shall approve the locations of test panels for each type of finish and surface.
 - 6. Contractor shall install additional mock-ups until approved without additional cost to the Owner. Do not proceed with any part of the work before the COTR approves the appropriate mockups.
 - 7. Approved mockups shall remain in place as part of the finished work.
 - 8. Report any proposed changes from procedures and materials used in original Field Mockup. Submit new sample having same dimensions and texture as

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- original Field Mockup for review. Upon acceptance, construct another Field Mockup with new materials and procedures for acceptance prior to proceeding further with restoration work.
9. Field Mockups will be viewed from a distance of five feet.
 10. If personnel changes during the progress of the work, new sample installations shall be prepared by person(s) doing the work.
- B. The approved mockups will be used to establish and judge both technical and aesthetic standards for the remainder of the Project.
1. Pointing: Cut and point a sample area on the building where directed by the COTR. Mockup to include both cut joints not filled with mortar and pointed joints with finish tooling. Mockup to consist of an area of approximately 8 SF of cut joints filled with mortar. Both vertical and horizontal joints shall be represented. The ability to repoint next to intact mortar shall be part of the evaluation.
- C. The approved mockups will be used to establish and judge both technical and aesthetic standards for the remainder of the Project.
- D. Mock up mix designs listed in Section 2.2. The final mix design will be chosen based on the mockups.

1.9 QUALITY ASSURANCE

- A. Restoration Contractor Qualifications: Masonry Restoration Contractor with a minimum of 10 years of experience with successfully completed masonry restoration projects on historic buildings (i.e., buildings listed on either the National or State Registers of Historic Places, either individually or within a historic district).
- B. Provide a list of projects showing at least 10 years. successful experience. Include the building name and address, the COTR, the General Contractor, the Architect/Engineer, and appropriate subcontractors with phone numbers and contact personnel.
- C. Preinstallation Conference: Attend a preconstruction conference at the site to be held with a representative of the Owner, Designer, Contractor, and other involved trades, if any, to discuss the work and coordination.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and obtain aggregate from a single source.
- E. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging the masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.
- F. Perform all work in strict accordance with all applicable laws and regulations of the building code and with all other authorities having jurisdiction. All such requirements shall take precedence over the requirements of the Specifications except where the requirements of the Specifications are more exacting or stringent.

- G. All mortar materials shall be mixed by the same person for each mortar type to insure consistency.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Keep all materials dry while they are transported, stored, and delivered.
- B. Deliver materials in original packages, containers, or bundles bearing the brand name and name of the manufacturer.
- C. Store all materials so as to keep them dry and within the temperature range recommended by the manufacturer. Including:
 - 1. Store binder and pigment materials off the ground, undercover, and in a dry location.
 - 2. Store aggregates, covered, and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.
- D. Store all materials so as to avoid and prevent contamination or cross-mixing with other materials.

1.11 PROJECT CONDITIONS

- A. Weather Conditions: Do not proceed with work during inclement weather or forecast of inclement weather, or when the temperature is above or below the manufacturer's recommended limitations for installation. COTR has final approval of permitting or halting Work based on weather.
- B. Contractor shall install a temperature and Relative Humidity data logger on site. Location to be approved by COTR. Reading intervals shall be no greater than 30 minutes. Contractor shall deliver all readings to the COTR as requested and at least weekly. Data logger shall be used as the instrument upon which all project conditions are judged.
- C. Cold Weather Requirements: Provide a detailed cold-weather work plan if temperatures may fall below 45 degrees.
- D. Hot-Weather Requirements: Provide a detailed hot-weather work plan if temperatures may rise above 90 deg F. Provide artificial shade and windbreaks and use cooled materials as required.
- E. Do not apply mortar to substrates in extreme temperatures without an approved plan. Contractor shall be responsible for the repair of all damage to adjacent materials due to the execution of the masonry work at no additional expense to the Client.
- F. Repairs shall be made by qualified personnel skilled in the type of repairs required, to the satisfaction of the COTR.
- G. Protect adjacent areas and surfaces not being worked on. Including the protection of all sills, ledges, and projections from droppings. Immediately remove dropped material in

contact with exposed stone and other surfaces.

- H. Maintain protection in-place until completion of Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products listed below represent materials that will likely be used for mortar restoration. This section assures quality of Work by listing regulatory language and by setting standards of quality for materials.
- B. Mortar: Site-mixed mortar consisting of a mixture of cement, lime, and sand. Provide samples and mockups of both mix designs included in Section 2.2; the mix design to be used in the final work is based on review of mockups. Do not use admixtures without written approval by the COTR. All exposed mortar is to have tooling, texture, and color to match the original mortar as determined from the approved mortar sample and mockup. Mortar constituents are as follows:
1. Sand: Natural sand meeting the requirements of ASTM C144, fineness modulus 2.0 to 2.5, or to match existing where outside that range. Color and texture of sand to match what was used in the original construction and as determined from the approved mortar sample and mockup. Use Ernest Maier's Mason Sand or COTR approved equivalent.
 2. Cement: White Portland cement meeting the requirements of ASTM C150, Type 1, color as determined from the approved mortar sample and approved mockup.
 3. Cement: Gray Portland cement meeting the requirements of ASTM C150, Type 1, color as determined from the approved mortar sample and approved mockup.
 4. Lime: Hydrated lime meeting the requirements of ASTM C207 Type S. Use Super Limoid Mason's Lime S or COTR approved equivalent.
 5. Water shall be potable, free from injurious amounts of oil, soluble salts, alkali, acids, organic impurities, and other deleterious materials.
 6. Mortar Pigment: DO NOT use mortar-coloring material unless at the COTR's request to obtain a color match. If requested by the COTR, integral coloring material shall consist of inert, nonfading, finely ground, alkali-fast mineral oxides made especially for cement/lime mortars. They must meet the requirements of ASTM C979. Limit coloring additive so as not to exceed 10% of the weight of the Portland cement. Do not use carbon black as a coloring additive material.
 7. Sealant or other caulk type materials shall not be used in mortar joints unless specifically called for as an expansion joint or in other specific circumstances.
- C. Cleaning: Clean potable water with natural or nylon bristle brushes. Metal bristle brushes are not permitted.

2.2 MORTAR MIX DESIGN

- A. Mortar mix shall be in accordance with ASTM C270.
- B. Mortar mixes shall not be at any time stronger in compressive strength than the masonry they are being used for.

- C. Mortar mixes are intended to be a starting point for the contractor. Final mortar selection by the COTR will be based on the evaluation of the material submittals for the binder, pigment, and sand for the proposed work and will be based on observation of field samples (test panels).
- D. All parts should be measured by volume using an accurate measuring tool, such as a coffee can or bucket (not a shovel). Mix dry ingredients (including pigments) thoroughly before adding water; water addition must be more carefully monitored for pigmented mortars than for mortars without pigment. To avoid over sanding, the sand must be added in damp, loose condition. If pre-portioned mixes are not used, pigments of a given color should be from a single lot. The lot should be recorded for a consistent color.
- E. Repointing mortars shall match existing mortars and aggregates as closely as possible.
- F. Mix Design: Use pointing mortar used in the 2024 restoration work. COTR provided mix design:

Mortar Type: N

- 1. Mix: 1:1:6 – Mix per mortar analysis
- 2. 1 Part Lehigh White and Gray Portland Type I
- 3. 1 Part Super Limoid Mason's Lime
- 4. 6 Parts Ernest Maier's Mason Sand

PART 3 - EXECUTION

3.1 EXAMINATION & INSPECTION

- A. Verify all site conditions and dimensions by field measurements. Notify the COTR immediately of any issues.

3.2 PROTECTION

- A. Schedule and execute all work without exposing the building interior to the effects of inclement weather. Protect the existing building, site work, landscaping, and the building interior from all risks associated with the work. Protect persons, property, and site as required. Provide protective coverings over the windows as required to prevent damage. Repair all damaged elements of the building caused by the work of this Section at no additional cost to the Owner.

3.3 GENERAL

- A. Remove contaminants such as grease, oil, and wax from exposed surfaces. Remove dust, dirt, loose stone, and debris. The substrate must be completely dry and free from dirt.
- B. Follow the manufacturer's instructions.
- C. Conduct all masonry work in a neat and workmanlike manner to prevent staining any surface with mortar or other spills. Keep all exposed surfaces of the stone free from a mortar at all times. Avoid dropping mortar on completed masonry work or other elements of the building. If mortar drops or spills, spot clean immediately using a clean sponge and clean water before the mortar can set.

- D. Follow all cold and hot weather work plan requirements.

3.4 MASONRY POINTING

- A. Remove existing mortar by hand or with power tools such that masonry is not overcut or joints enlarged during the mortar removal process. COTR will disallow the use of power tools if evidence is found that mortar joints are being overcut or enlarged. If using power tools, cut down the center of the joint with power tools and then remove the remaining mortar with hand tools. Do not chip or cut into adjacent masonry.
- B. Power tools may only be used to relieve the joint by cutting a central line in the mortar. Saws or grinders are not permitted to touch the granite or be used to clean the granite.
- C. Remove mortar from joints scheduled for pointing to whichever of the following depths is greatest:
 - 1. Depth equal to 2-1/2 times the mortar joint width
 - 2. Depth of 1 in.
 - 3. Depth of removal until sound, solid, void-free mortar is reached, after removing all deteriorated or friable mortar, and all mortar containing visible voids.
- D. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and exposed masonry sides for contact with pointing mortar.
- E. Remove gross mortar particles and sand with vacuums.
- F. Rinse joint surfaces with water to remove dust particles. Time application of rinsing so that, at the time of pointing, excess water has evaporated or runoff and joint surfaces are damp but free of standing water.
- G. Apply mortar in successive, compacted, layers until a uniform depth is formed. Compact each layer thoroughly and allow it to become thumbprint-hard before applying the next layer. Allow at least 24 hrs to pass between successive stages of mortar application to allow for mortar shrinkage between stages.
- H. After joints are filled to a uniform depth, place the remaining pointing mortar in successive layers of no greater than 1/2 in depth until flush with the exterior face of the stone. Fully compact each layer and allow it to become thumbprint-hard before applying the next layer. Where existing stones have rounded edges, recess the final layer slightly from the face. Take care not to spread mortar over the edges and onto the exposed face.
- I. When mortar at the exterior face is thumbprint-hard, tool to form a joint to match historic mortar profile, per the approved mock-ups. Remove excess mortar from the edge of the joint by brushing.
- J. Match existing beaded joint profile.
- K. Finished joints must match existing adjoining joints in color, texture, tooling, size, and profile, including depth of recess from the face of the unit masonry (e.g., stone or stone).

- L. Protect joints from direct exposure to the sun for a minimum of 72 hours after installation. Cure mortar by maintaining it in a damp condition for not less than 72 hrs. by keeping masonry covered with tarpaulins or damp cloths (e.g., burlap), and using a fog spray periodically to maintain moist conditions under the ta. Do not wash the newly pointed mortar with a stream of water.
- M. Point mortar joints only after the stone surface area has been cleaned.
- N. Replace any mortar joints that exhibit cracking or separation from adjacent stone surfaces after curing.

3.5 CLEAN UP

- A. Monitor weather prior to work to ensure that air temperatures remain between 50°F and 90°F as recommended by all manufacturers and permitted by the hot and cold weather work plans.
- B. Ensure that building components are not to be cleaned and adjacent persons, property, and plant life are protected from all cleaning activities and wind drift. Mask all windows, ornamental fixtures, hardware, wood doors, or other non-masonry surfaces.
- C. Clean the repointed masonry to remove all laitance, efflorescence, and discoloration from the stone masonry surfaces resulting from the work of this section. Use water with nylon or natural bristle brushes. Do not use metal scrapers, metal brushes, or chemicals or cleaning agents not specifically approved during mock-ups for this work.
- D. At the conclusion of repointing, remove all scaffolding and equipment used in the Work. Clean all debris, refuse and surplus of material and remove same from premises.

END OF SECTION 04 0140.62

SECTION 04 0140.52 – STONE CLEANING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY OF WORK

- A. Section includes cleaning of stone masonry as follows:
 - 1. Perform and provide all submittals, surveys, shop drawings, and mockups as identified in this section.
 - 2. General stone cleaning is used to remove general soiling, biological growth, light water, carbon, or efflorescence, and light metallic staining.
 - 3. Specialized Deep Stone Cleaning to remove heavy water staining, oxidation or heavy metallic staining.
 - 4. Bituminous stain removal.
- B. Other Sections of these Specifications that relate to the work of this Section include the following:
 - 1. Section 01 3591.01 – Historic Treatment Procedures
 - 2. Section 04 0140.00 – Masonry Repointing
 - 3. Section 04 0140.92 – Stone Restoration
 - 4. Section 07 0190.81 – Joint Sealant Replacement

1.3 REFERENCES

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.4 UNIT PRICES

- A. Unit prices apply to authorized work covered by estimated quantities. Unit prices apply to additions to and deletions from work as authorized by Change Orders.
- B. All quantities listed on the Drawings are approximate. Contractor pricing is to reflect quantities listed on the Drawings. Include the cost of each cleaning type in unit prices as requested by the Contract Documents.
- C. See Division 1, Section 5 for Schedule of Unit Prices

1.5 REFERENCE STANDARDS

- A. In general, follow all requirements, recommendations, and procedures of the following standards and publications, except where these Contract Documents are more stringent.
 - 1. Smithsonian Directive 418, Smithsonian Institution Historic Preservation Policy.
 - 2. National Park Service, Preservation Brief #2, "Repointing Mortar Joints in Historic Masonry Buildings."
 - 3. Secretary of the Interior's Standards for the Treatment of Historic Properties.
 - 4. ACI 530 – Building Code Requirements for Masonry Structures.
 - 5. American Society of Testing and Materials (ASTM): Standards as specified or referenced herein.
 - 6. Product manufacturer's written instructions and recommendations.

1.6 SUBMITTALS

- A. Preconstruction and Construction photographs: Provide clear before and after photos of each work area once access is set up. Provide photos on a weekly basis as work progresses.
- B. Contractor qualifications. Provide subcontractor qualifications as required under Quality Assurance.
- C. Submit the following items from the manufacturer.
 - 1. Submit a current copy of the pertinent referenced standards.
 - 2. Manufacturer's installation recommendations. Include the instructions and recommendations for all phases of work, including preparation of substrate, application of materials, weather limitations, and protection of installed material.
 - 3. Submit the manufacturer's product data and Safety Data Sheets (S.D.S.) for each product indicated.
 - 4. Any warranty information provided by the manufacturer.
 - 5. Submit a statement from the manufacturer that product(s) to be used will be compatible with the different types of masonry surfaces where they will be used and that the material and process will not be in conflict with other products that will be used during the Work.
- D. Submit a schedule of work for approval by the COTR.
- E. Submit a work plan describing the chemicals used to clean and the procedures used to protect inlets, and capture, store, sample, and dispose of all waste generated throughout this project.

1.7 MOCKUPS

- A. Prepare field samples for restoration methods to demonstrate aesthetic effects and quality of materials and execution. Use materials and methods proposed for completed Work and prepare samples under the same weather conditions to be expected during the remainder of Work.
 - 1. Locate mockups on the building where directed by the COTR.
 - 2. Notify COTR 7 days in advance of the dates and times when samples will be prepared.
 - 3. The Contractor shall prepare sample installations for cleaning types indicated. Panels should be chosen in discrete locations to represent the conditions of the

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- building as a whole.
 - a. General cleaning (metallic residue on vertical surface) – 2 SF
 - b. Removal of biological staining – 2 SF.
 - c. Removal of deep metallic staining on horizontal surface (cornice) – 2 SF.
 - d. Removal of bituminous stain – 2 LF.
 - 4. Sample installations will serve to determine the time required for project completion and the suitability of materials used.
 - 5. Contractor shall mark each mockup to indicate product name, dilutions, dwell times, and rinse times. Contractor will include this information in a written report with before and after photographs, pH levels (before and after), and final procedures for approval by COTR.
 - 6. Samples must be prepared by the person who will be installing them on the Project.
 - 7. COTR shall approve the locations of test panels for each type of finish and surface.
 - 8. Additional sample installations, up to a maximum of 3 for each type of cleaning, shall be prepared if necessary to obtain satisfactory results at no additional cost to the Owner. Do not proceed with any part of the work before the COTR approves the appropriate mockups.
 - 9. Mock-ups will be viewed from a distance of five feet for uniformity of appearance and cleanliness.
 - 10. Approved mockups shall remain in place as part of the finished work.
 - 11. Report any proposed changes from procedures and materials used in original Field Mockup. Submit new sample having same dimensions and texture as original Field Mockup for review. Upon acceptance, construct another Field Mockup with new materials and procedures for acceptance prior to proceeding further with restoration work.
 - 12. If personnel changes during the progress of the work, new sample installations shall be prepared by person(s) doing the work.
- B. The approved mockups will be used to establish and judge both technical and aesthetic standards for the remainder of the Project.

1.8 QUALITY ASSURANCE

- A. Restoration Contractor Qualifications: Masonry Restoration Contractor with a minimum of 10 years of experience with successfully completed masonry restoration projects on historic buildings (i.e., buildings listed on either the National or State Registers of Historic Places, either individually or within a historic district).
- B. Provide a list of projects showing at least 10 years of successful experience. Include the building name and address, the COTR, the General Contractor, the Architect/Engineer, and appropriate subcontractors with phone numbers and contact personnel. The information shall highlight projects utilizing the specified materials.
- C. Contractor shall also submit a statement describing the experience and qualifications of key personnel who will work on this project, including technicians, craftsmen, and artisans. Include names and addresses of projects successfully completed, and for each, include the name, address, and phone numbers of the owner and the name and address of the architect, if any.

- D. Field Supervision: Require restoration specialist firms to maintain an experienced full-time supervisor on the Project site during times when masonry restoration is in progress.
- E. Preinstallation Conference: Attend a preconstruction conference at the site to be held with a representative of the Owner, Designer, Contractor, and other involved trades, if any, to discuss the work and coordination.
- F. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging the masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.
- D. Perform all work in strict accordance with all applicable laws and regulations of the building code and with all other authorities having jurisdiction. All such requirements shall take precedence over the requirements of the Specifications except where the requirements of the Specifications are more exacting or stringent.

1.2 DELIVERY, STORAGE, AND HANDLING

- A. Keep all materials dry while they are transported, stored, and delivered.
- B. Deliver materials in original packages, containers, or bundles bearing the brand name and name of the manufacturer.
- C. Store all materials to keep them dry and within the temperature range recommended by the manufacturer.
- D. Store all materials to avoid and prevent contamination or cross-mixing with other materials.
- E. The owner must approve the storage location.

1.3 PROJECT CONDITIONS

- A. Weather Conditions: Do not proceed with work during inclement weather or forecast of inclement weather, or when the temperature is above or below the manufacturer's recommended limitations for installation. COTR has final approval of permitting or halting Work based on weather.
- B. Protect adjacent areas and surfaces not being cleaned with barriers suitable for the chemical cleaners being used.
- C. Protect trees, plants, foliage, storm sewers, and surrounding surfaces from cleaning chemicals, residue, and rinse waters.
- D. Take appropriate precautions to avoid harm to building occupants, pedestrians, and nearby property. Terminate work when wind drift may injure passersby or damage vehicles and adjacent property.
- E. Contractor shall be responsible for the repair of all damage to adjacent materials due to the execution of the cleaning work at no additional expense to the Client.
- F. Repairs shall be made by qualified personnel skilled in the type of repairs required, to the satisfaction of the COTR.

- G. Protect adjacent areas, plants, and surfaces not being worked on from drips, overspray or runoff. Clean all windows at or below work area if overspray or runoff leaves spots or streaks on glass.
- H. Maintain protection in-place until completion of Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products listed below represent materials that will likely be used to clean masonry. This section assures quality of Work by listing regulatory language and by setting standards of quality for materials. Information from the testing shall guide product selection and restoration procedures.
- B. Order replacement materials at the earliest possible date to avoid delaying completion of the Work.
- C. General Pre-Cleaning: To remove general soiling and biological growth. Use a water-borne disinfectant that has no special handling or storage requirements for removal of algae growth as necessary, such as D/2 Biological Solution as manufactured by D/2 Biological Solutions, Inc., PO Box 3746, Westport, MA, or COTR approved equivalent.
- D. General Stone Cleaning to remove light metallic staining, heavy carbon or general staining. Use a water based, biodegradable cleaner such as Oxidation Remover, or COTR approved equivalent. Manufactured by Cathedral Stone Products, Inc.; 7266 Park Circle Drive 8332, Hanover, Maryland 21076; Tel: 410-782-9150; Fax: 410-782-9155; jahn@smartnet; <http://www.jahnmortars.com>.
- E. Specialized Deep Staining Removal: To remove deep metallic stains and rust, Use a neutral gel-based cleaner such as CSP Light Duty Rust Remover, or COTR approved equivalent. CSP Oxidation Remover may also be used. Manufactured by Cathedral Stone Products, Inc.; 7266 Park Circle Drive 8332, Hanover, Maryland 21076; Tel: 410-782-9150; Fax: 410-782-9155; jahn@smartnet; <http://www.jahnmortars.com>.
- F. Bitumen- Use mechanical hand method with wood or nylon scrapers.
- G. When using water always use a low-pressure sprayer, clean water, and soft nylon brushes.
- H. Contractor shall include the cost for all miscellaneous materials for cleaning, including proper protection.

PART 3 - EXECUTION

3.1 EXAMINATION & INSPECTION

- A. Verify all site conditions and dimensions by field measurements. Notify the COTR immediately of any issues.
- B. Test all drains and other water removal systems to ensure that drains and related systems are functioning properly prior to performing any masonry operation. The

Contractor shall immediately notify the Owner of any drains or systems that are found to be stopped or blocked.

- C. Test runoff to determine possible environmentally hazardous materials. Do not permit runoff to enter the storm drain system. Capture contaminated runoff, neutralize, and properly dispose.
- D. Inspect all work areas prior to cleaning for any potential areas of moisture penetration such as at open joints. Provide temporary measures to prevent water ingress.

3.2 DRAIN LINE PROTECTION

- A. Identify drain locations. If at grade, describe how the areas below the work area will be protected from cleaning effluent, streaking, etc. Confirm with Authorities Having Jurisdiction discharge into wastewater system is acceptable. Obtain DC Temporary Discharge Authorization Permit if any discharge to stormwater drain system is anticipated.
- B. During the masonry cleaning operations, provide a method to prevent solids such as sand or masonry residue from entering the drains and drain lines.
- C. The Contractor shall be responsible for cleaning out all drains and drain lines that become blocked or filled by sand or other solids due to Work.
- D. Drain lines may include those beyond the immediate work area should they be affected.
- E. Residues of cleaning including water and soil shall be collected and disposed of properly. Do not allow water to pool.
- F. All inlets shall be identified and protected prior to initializing work.

3.3 PREPARATION & INITIAL RINSE

- A. Remove large contaminants such as dust, dirt, loose stone, and debris. The substrate must be completely dry and free from dirt.
- B. Test pH of surface before and after each cleaning procedure to confirm complete rinsing of chemical residues. Document results and submit to COTR.
- C. Prior to performing all other cleaning, use a low-pressure water rinse to flush the masonry.
- D. No water pressure washing of any kind shall be permitted. Rinsing shall not be done in excess of 1000 psi. No grit blasting, either dry or wet, shall be permitted.
- E. All rinsing shall be with a 15-40° or larger fan tip nozzle. Use of hollow cone nozzles or jets shall not be permitted.
- F. Nozzles should be held perpendicular to the surface at a distance between 18 and 30 inches from the surface.

- G. Substrate must be free of dust, dirt, oils, form release agent residues, and chemical contaminants.
- H. Verify that no damage is occurring to the surface of the stone at frequent intervals.

3.4 GENERAL CLEANING - BIOLOGICAL

- A. Follow the manufacturer's instructions.
- B. This section is specific to the product listed in the products section. Modify this section if another product is tested and selected.
- C. Utilizing a soft nylon brush, gently wipe loose debris from the surface.
- D. Allow the masonry surface to dry thoroughly.
- E. Follow with an application of water-borne disinfectant with a spray bottle to masonry surfaces designated on the drawings as a biological growth retardant.
- F. Allow the cleaner to dwell for a minimum of 15 minutes in affected areas before applying a plain water wash to remove residue, as required.
- G. Note: The surface may appear to change colors as the biological growth is treated and it begins to die. For example, some areas may appear bright pink. This is not permanent, nor will it harm the masonry.
- H. No water pressure washing of any kind shall be permitted. Rinsing shall not be done in excess of 1000 psi.
- I. All rinsing shall be with a 15-40° or larger fan tip nozzle. Use of hollow cone nozzles or jets shall not be permitted.
- J. Nozzles should be held perpendicular to the surface at a distance between 18 and 30 inches from the surface.

3.5 GENERAL CLEANING - LIGHT METALLIC STAINING, LIGHT EFFLORESCENCE, CARBON OR GENERAL STAINING.

- A. Follow the manufacturer's instructions.
- B. Install runoff capture system and protection of all surfaces not intended to be cleaned.
- C. If cleaning in the vicinity of new copper, protect copper surfaces from cleaner or overspray to avoid discoloration.
- D. This section is specific to the product listed in the products section. Modify this section if another product is tested and selected.
- E. Utilizing a soft nylon brush, gently wipe loose debris from the surface.
- F. Dilute cleaner between 1:2 and 1:4 per approved mock-up. Do not apply full strength.

- G. Apply cleaner using a brush, roller, or airless sprayer.
 - H. Leave the cleaner on the substrate only as long as determined acceptable in the mock-ups and approved by the COTR. A minimum 20-minute dwell time is anticipated and up to two applications for general cleaning where metallic residues are present, more if staining is very deep.
 - I. Do not over-clean surfaces.
 - J. For removal, begin at the top of each section and pressure wash the cleaner and residue off the substrate.
 - K. Limit water pressure and working distance used to avoid damage to stone, mortar, painted surfaces, and security equipment. In no case should water pressure exceed 1,000psi. Protect any device, equipment, or any surface that may be damaged or stained by water or runoff.
 - L. All rinsing shall be with a 15-40° or larger fan tip nozzle. Use of hollow cone nozzles or jets shall not be permitted.
 - M. Nozzles should be held perpendicular to the surface at a distance between 18 and 30 inches from the surface.
 - N. Be sure all of the cleaner and residue are washed off the substrate and any surface below work area.
 - O. Comply with all local, state, and Federal regulations regarding runoff and capture
- 3.6 SPECIALIZED DEEP CLEANING – TO BE USED ONLY AFTER OTHER METHODOLOGIES AND IN SMALL QUANTITIES.
- A. Follow the manufacturer's instructions.
 - B. This section is specific to the product listed in the products section. Modify this section if another product is tested and selected.
 - C. Utilizing a soft nylon brush, gently wipe loose debris from the surface.
 - D. Apply cleaner using a brush.
 - E. Leave the cleaner on the substrate only as long as determined acceptable in the mock-ups and approved by the COTR.
 - F. For removal, begin at the top of each section and pressure wash the cleaner and residue off the substrate.
 - G. Be sure all of the cleaner and residue are washed off the substrate.
 - H. Limit water pressure and working distance used to avoid damage to stone, mortar, painted surfaces, and security equipment. In no case should water pressure exceed 1,000psi. Protect any device, equipment, or any surface that may be damaged or stained by water or runoff.

- I. All rinsing shall be with a 15-40° or larger fan tip nozzle. Use of hollow cone nozzles or jets shall not be permitted.
- J. Nozzles should be held perpendicular to the surface at a distance between 18 and 30 inches from the surface.
- K. Test pH of surface after rinsing to confirm removal of residues.

3.7 BITUMEN CLEANING

- A. Follow the manufacturer's instructions.
- B. This section is specific to the product listed in the products section. Modify this section if another product is tested and selected.
- C. Using a new and clean scraper, gently pop bitumen off. Gentle tapping of residues may also be used to assist in loosening residues. If effort is causing any scratching or disfigurement of the stone, immediately stop and notify COTR.
- D. Bitumen- Use the mechanical hand method with metal scrapers and stainless-steel brushes. Gently tap the surface to loosen the material. 100% removal is not expected.
- E. Do not scratch, chip, or discolor the surface of the granite.
- F. Vacuum up all loose particles while cleaning.

3.8 PROTECTION

- A. Schedule and execute all work without exposing the building interior to the effects of inclement weather. Protect the existing building, site work, landscaping, and the building interior from all risks associated with the work. Protect persons, property, and site as required. Provide protective coverings over the windows as required to prevent damage. Repair all damaged elements of the building caused by the work of this Section at no additional cost to the Owner.

3.9 GENERAL WORKMANSHIP

- A. Conduct all work in a neat and workmanlike manner to prevent staining any surface or other spills.
- B. Provide hot and cold weather work plans if temperatures exceed the manufacturer's recommendations.
- C. Monitor weather prior to work to ensure that work is in compliance with that recommended by the manufacturer and that work complies with an approved weather work plan.

3.10 FINAL CLEANING

- A. Ensure that building components not to be cleaned and adjacent persons, vehicles, property, and plant life are protected from all cleaning activities and wind drift. Mask all non-masonry surfaces.
- B. Clean any surfaces blocked or concealed by scaffolding or bracing components.

END OF SECTION 04 0140.52

SECTION 04 0410.92 - STONE RESTORATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide materials, labor, equipment, and services necessary to furnish, deliver, and install all work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.
- B. This Section includes the following items where indicated on the Drawings:
 - 1. Dutchman repairs.
 - 2. Granite patching mortar.
 - 3. Crack repair with injection grout.
 - 4. Repointing between granite units.
 - 5. Removal & resetting granite.
 - 6. Replace existing iron cramps.
 - 7. Lead T-caps installation and adjacent inspection.
 - 8. Reglet for new copper coping.
 - 9. Install new stainless-steel cramps at parapets.
- C. Related Sections include the following:
 - 1. Section 01 3591.00 – Historic Treatment Procedures.
 - 2. Section 04 0140.52 – Stone Cleaning.
 - 3. Section 04 0140.62 – Masonry Repointing
 - 4. Section 07 0190.81 – Joint Sealant Replacement
 - 5. Section 07 6000.00 – Flashing and Sheet Metal

1.3 REFERENCE STANDARDS

- A. In general, follow all requirements, recommendations, and procedures of the following standards and publications, except where these Contract Documents are more stringent.
 - 1. Smithsonian Directive 418, Smithsonian Institution Historic Preservation Policy.
 - 2. Secretary of the Interior's Standards for the Treatment of Historic Properties.
 - 3. ACI 530 – Building Code Requirements for Masonry Structures.
 - 4. American Society of Testing and Materials (ASTM): Standards as specified or referenced herein.
 - 5. Product manufacturer's written instructions and recommendations.

1.4 UNIT PRICES

- A. Include the cost of anchor pins, epoxy, mortar, and other related components in unit prices requested in other sections of this Specification.
- B. See Division 1, Section 5 for Schedule of Unit Prices

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
 - 1. Product Data: For each product indicated.
 - 2. Shop Drawings of scaffolding protection design, signed and sealed by a structural engineer.
 - 3. Verification of Structure for any scaffolding resting on or supported by any part of the building.
 - 4. Shop Drawings for dutchman and replacement stones to include sizes and anchorage details.
 - 5. Samples of each type of stone to be provided. Samples to be approximately 3 x 4 x 9 inch and shall be typical of color range, tooling, and texture of stone to be provided.
 - 6. Sample of Granite Patching Mortar color range to match existing stone, including proposed stippling to match speckled appearance of Mount Airy and Bethel Granite. Provide 4" x 4" x 1" samples of each.
 - 7. Sample of stainless steel dowels, cramps, anchor pins, and stone anchors.
 - 8. Detailed work plan for removal and resetting granite to access rotunda tension ring (Option 2)

1.6 QUALITY ASSURANCE

- A. Contractor and specific tradesmen performing work of this section shall have a minimum of 10 years experience in masonry restoration similar in material, design, and extent to that indicated for this project. They shall have a minimum of 7 years in tooling and carving decorative stone. They and shall have successfully completed 3 granite restoration projects using specified materials. Note master masons, stone carver, or other key personnel must be identified by name and be available to perform work in this section and not simply supervise others work.
- B. Substitution of specific tradesmen during work must be approved by the COTR.
- C. Contractor shall submit a statement describing experience and qualifications of firm and of key personnel who will work on this project, include technicians, craftsmen, and artisans. Include names and addresses of projects successfully completed and for each include information on the name, address, and phone numbers of owner, and name and address of architect, if any. All personnel performing mortar restoration must satisfy all qualifications with documentation must be presented with the bid package.

- D. Report any proposed changes from procedures and materials used in original Field Mockup. Submit new sample having same dimensions and texture as original Field Mockup for review. Upon acceptance, construct another Field Mockup with new materials and procedures for acceptance prior to proceeding further with restoration work.
- E. Field Supervision: Require restoration specialist firms to maintain an experienced full-time supervisor on the Project site during times that masonry restoration is in progress.
- F. Mockups: Prepare field samples for restoration methods to demonstrate aesthetic effects and qualities of materials and execution. Use materials and methods proposed for completed Work and prepare samples under same weather conditions to be expected during remainder of Work.
 - 1. Locate mockups on the building where directed by COTR.
 - 2. Stonework Repair: Prepare sample panels of size indicated for each type of stone material indicated to be repaired or replaced. Erect sample panels into an existing wall, unless otherwise indicated, to demonstrate the quality of materials and workmanship.
 - a. Dutchman repair. – 3 each.
 - b. Cementitious patch removal. – 2 each at 1 SF. each.
 - c. Installation of Granite patching mortar. –3 each at least 8 Sq.In. each.
 - d. Crack injection with cementitious grout - 2 LF.
 - e. Crack repair for 1/8" or larger cracks – 2 LF
 - f. Sealant installation – 1 LF
 - g. Lead T-cap Installation – 1 LF.
 - h. Reglet for copper coping
 - i. Cramp installation – 1 each.
 - 3. Notify COTR 7 days in advance of the dates and times when samples will be prepared.
 - 4. Obtain COTR's approval of mockups before starting the remainder of masonry restoration. Note it is possible that not all procedures outlined in this specification will be used during construction.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work. Approved mockups will become part of the Work.
- G. Source of Materials: Obtain materials for stone restoration from a single source for each type of material required (stone, cement, sand, etc.) to ensure a match of quality, color, pattern, and texture. All stones shall be hand-selected to match the existing range of stone colors.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Carefully pack, handle, and ship stone and accessories strapped together in suitable packs or pallets or in crates or heavy-duty containers.
- B. Deliver other materials to Project site in manufacturer's original and unopened con-

ainers, labeled with type and name of product and manufacturer.

- C. Store cementitious materials off the ground, under cover, and in a dry location.
- D. Store aggregates, covered, and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.
- E. Store stone on wood pallets or wood blocking and cover with non-staining waterproof covering. Allow air to circulate around stone.
- F. Do not use pinch or wrecking bars to move stone. Lift stone with wide belt slings. Do not use wire ropes. Use wood rollers to move large stone pieces.
- G. Remove damaged stone from site and replace with new stone at no additional cost to Owner.

1.8 PROJECT CONDITIONS

- A. Weather Conditions: Do not proceed with work during inclement weather or forecast of inclement weather, or when the temperature is above or below the manufacturer's recommended limitations for installation. COTR has final approval of permitting or halting Work based on weather.
- B. Contractor shall install a temperature and Relative Humidity data logger on site. Location to be approved by COTR. Reading intervals shall be no greater than 30 minutes. Contractor shall deliver all readings to the COTR as requested and at least weekly. Data logger shall be used as the instrument upon which all project conditions are judged.
- C. Cold Weather Requirements: Provide a detailed cold-weather work plan if temperatures may fall below 45 degrees.
- D. Hot-Weather Requirements: Provide a detailed hot-weather work plan if temperatures may rise above 90 deg F. Provide artificial shade and windbreaks and use cooled materials as required.
- E. Do not apply restoration products to substrates in extreme temperatures without an approved plan. Contractor shall be responsible for the repair of all damage to adjacent materials due to the execution of the masonry work at no additional expense to the Client.
- F. Repairs shall be made by qualified personnel skilled in the type of repairs required, to the satisfaction of the COTR.
- G. Protect adjacent areas and surfaces not being worked on. Including the protection of all sills, ledges, and projections from droppings. Immediately remove dropped material in contact with exposed stone and other surfaces.

- H. Maintain protection in-place until completion of Work.
- I. Store all materials so they do not fall above or below manufacturer's specified storage conditions.

1.9 SEQUENCING AND SCHEDULING

- A. Order replacement materials at the earliest possible date, to avoid delaying completion of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products listed below represent materials that will likely be used to clean masonry. This section assures quality of Work by listing regulatory language and by setting standards of quality for materials. Information from the testing shall guide product selection and restoration procedures.
- B. Order replacement materials at the earliest possible date to avoid delaying completion of the Work.

2.2 MORTAR MATERIALS AND MIXES

- A. Mortars - See Section 04 0140.62.

2.3 RESTORATION MATERIALS

- A. Base Bid & Option 1 Granite: Mount Airy Granite, Mount Airy, NC; Available through Polycor, 120 W 7th St Suite 210. Bloomington, IN 47404, Ph: 812.287.7500
- B. Option 2 Granite: Bethel White Granite, Bethel Vermont; Available through Polycor, 120 W 7th St Suite 210. Bloomington, IN 47404, Ph: 812.287.7500
- C. Stone replacement must match specific tonal ranges of existing stone as well as tooling marks. Contractor shall obtain enough stone to allow for careful color matching. Final color matching must be approved by the COTR. Verify sizes required, finish, and texture on-site before making submittals. Assume all stone to be tooled and sandblasted to match existing surfaces to be repaired. Contractor is not limited to a specific quarry. Contractor shall submit quarry information and stone samples from selected quarry or quarries along with bid. COTR will have final approval on all replacement stone.
- D. Masonry Pins: Threaded rod of sizes noted on the Drawings or listed herein, AISI Type 302 or 304 stainless steel.
- E. Masonry Cramps: Custom bent, smooth 3/8" rod, AISI Type 302 or 304 stainless

steel. Size to match existing (approx. 8-1/2" x 2").

- F. Epoxy Adhesive for Setting Dutchmen: BonStone Touchstone Glacier knife grade epoxy as manufactured by Bonstone Materials Corp., 707 Swan Dr, Mukwonago, WI 53149, or COTR approved equivalent.
- G. Mortar fill for dutchmen joints: Custom colored Jahn M30 [Micro Injection Grout](#) or COTR approved equivalent. Jahn grouts and mortars available from Cathedral Stone Products, Inc.; 7266 Park Circle Drive 8332 Hanover, Maryland 21076. Tel: 410-782-9150, Fax: 410-782-9155; jahn@smartnet; <http://www.jahnmortars.com>.
- H. Epoxy Adhesive for Setting Pins: Hilti HIT-HY 200-R V3 Adhesive Anchor as manufactured by Hilti North America, 7250 Dallas Pkwy., Ste. 1000 Plano TX 75024 or COTR approved equivalent.
- I. Crack Repair Materials: to be custom colored Jahn M31 or M32 [Restoration Mortar](#) or COTR approved equivalent. Jahn grouts and mortars available from Cathedral Stone Products, Inc.; 7266 Park Circle Drive 8332 Hanover, Maryland 21076. Tel: 410-782-9150, Fax: 410-782-9155; jahn@smartnet; <http://www.jahnmortars.com>.
 - 1. M31 Grout for cracks 1/16"-1/8" wide.
 - 2. M32 Grout for 1/8"- 3/8" wide.
- J. Cementitious pointing and bedding material shall be as follows:
 - 1. Cement mortar mix: Refer to Section 04 0410.62.
 - 2. Masonry pigment shall be non-fading, mineral oxide masonry pigment. Refer to Section 04 0140.62.
- K. Granite Patching Material to be Jahn M160 [Restoration Mortar](#) or COTR approved equivalent. Obtain custom patching material to match specific tonal ranges in surrounding granite surfaces. Final color approval must be approved by the COTR. Jahn grouts and mortars available from Cathedral Stone Products, Inc.; 7266 Park Circle Drive 8332 Hanover, Maryland 21076. Tel: 410-782-9150, Fax: 410-782-9155; jahn@smartnet; <http://www.jahnmortars.com>.
- L. Stain: If needed to match adjacent features of existing stone, use a black potassium silicate stain stippled or lightly flecked onto surface with a stiff brush to mimic Mount Airy and Bethel Granite. Use Potassium Silicate Mineral Paints and Stains or COTR approved equivalent, color MR-318 (Black) available from Cathedral Stone Products, Inc.; 7266 Park Circle Drive 8332 Hanover, Maryland 21076. Tel: 410-782-9150. <http://www.cathedralstone.com>.
- M. Rust Converting Metal Primer: Corroseal or COTR approved equivalent. Available from Rodda Paint Company, 6107 North Marine Drive, Portland, OR 97203, Tel. 1.800.452.2315, <http://www.roddapaint.com>.
- N. Cycloaliphatic Amine Epoxy Paint for Steel Tension Ring: Carbogard 890 or COTR approved equivalent. Available from Carboline, 2150 Schuetz Rd., St. Louis, MO

63146, Tel: 1-800-848-4645, <http://www.carboline.com>

O. Miscellaneous:

1. Stone shims: Use only non-corrosive shims such as nylon shims. Cushions to maintain joint widths shall be lead or plastic of thickness to match joint size. Do not use wood shims.
2. Use plastic or stainless-steel setting buttons, steel washers are prohibited.
3. Flexible Dovetail Shims: Use #315 – 5" Long- Flexible Dovetail Shims from Hohmann & Barnard, Inc. 30 Rasons Court • P.O. Box 5270 • Hauppauge, NY 11788-0270 Telephone: (631) 234-0600 or COTR approved equivalent.

2.4 FABRICATION

- A. Fabricate stonework to sizes and shapes required to comply with tooling and details on drawings, matching submitted templates, and reviewed shop drawings, or to match existing stones to be replaced.
- B. Cut or carve stone pieces to conform with details on Drawings or to match existing, as required. Work shall be done by experienced stonecutters qualified to produce the type work required.

PART 3 - EXECUTION

3.1 EXAMINATION & INSPECTION

- A. Verify all site conditions and dimensions by field measurements. Notify the COTR immediately of any issues.

3.2 PROTECTION

- A. Schedule and execute all work without exposing the building interior to the effects of inclement weather. Protect the existing building, site work, landscaping, and the building interior from all risks associated with the work. Protect persons, property, and site as required. Provide protective coverings over the windows as required to prevent damage. Repair all damaged elements of the building caused by the work of this Section at no additional cost to the Owner.

3.3 GENERAL

- A. Remove contaminants such as grease, oil, and wax from exposed surfaces. Remove dust, dirt, loose stone, and debris. The substrate must be completely dry and free from dirt.
- B. Follow the manufacturer's instructions.
- C. Conduct all masonry work in a neat and workmanlike manner to prevent staining any surface with mortar or other spills. Keep all exposed surfaces of the stone free

from a mortar at all times. Avoid dropping mortar on completed masonry work or other elements of the building. If mortar drops or spills, spot clean immediately using a clean sponge and clean water before the mortar can set.

- D. Follow all cold and hot weather work plan requirements.

3.4 FULL STONE REMOVAL AND REPLACEMENT – ROTUNDA DRUM (OPTION 2)

- A. The work on the rotunda was designed without access, as-built drawings, or construction drawings. The initial step involves examining the dome's first two layers of stone to view the masonry connection to the dome structure and roof. This probe is crucial for understanding the scope of work needed for the restoration option 2. Once the construction of the dome is confirmed through the examination, the upper stone and rotunda repairs are likely to require modification to address the structural findings of the actual dome construction. Note that roofing work is integral to all masonry work in this location.
- B. Support and protect remaining stonework, roofing, and gutters that surrounds removal area. Maintain reinforcement and adjoining construction in an undamaged condition. Limit the amount of stone to be removed at one time to avoid displacing stone or roofing above.
- C. Carefully remove by hand, existing granite corbel(s) as required to access concealed tension ring. Removal of the stonework around the tension ring will need to be done in a sequential manner to maintain sufficient support for the upper layers of the Guastavino tile at the base of the dome. Protect contiguous stonework and roofing from damage caused by removal and installation of new stone.
- D. Install temporary protection at areas of removal to prevent water penetration into dome during all work activities.
- E. TENSION RING: Expose tension ring and inspect to determine condition and degree of loss.
 - 1. Remove all loose rust, paint, and other deposits down to bright metal (SSPC – SP3). Notify COTR if loss from corrosion is more than 10%.
 - 2. Smithsonian Structural Engineer shall be on site to review steel conditions once exposed. Work indicated is based on assumed deterioration. Additional steel repair/reinforcement may be required,
 - 3. Apply Rust Converting Metal Primer in accordance with manufacturer's recommendations.
 - 4. After primer has cured, prepare surface for epoxy mastic top coating in accordance with manufacturer's recommendations.
 - 5. Apply epoxy mastic top coating within specified open time by manufacturer and in accordance with manufacturer's recommendations.
- F. Install new fully adhered membrane through flashing to maintain integrity of waterproofing at dome in areas of removal, per approved shop drawings.

- G. Remove existing mortar from adjoining masonry in order to lay new stone units entirely in new mortar. Wash out loose mortar and dust with a jet of water. Leave in a damp condition with no standing water.
- H. Clean stone surfaces that have become soiled or stained during storage by scrubbing with fiber bristle brushes and water, rinsing thoroughly with clean water. If necessary to remove soil and stains, use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.
- I. Set stones to comply with the requirements indicated on Drawings and reviewed shop drawings. Provide and install new stainless-steel cramps and anchors to secure stone per approved shop drawings.
- J. Replace stones that are damaged to permit removal, Assume four full units for bidding purposes. Locate new stones on the North side of the dome.
- K. Shim and adjust anchors to support stonework in proper position and secure from movement. Joints shall be uniform and match existing as closely as possible. Use non-corrosive shims.
- L. Set stones in full mortar bed with vertical joints completely full. Place setting buttons to maintain joint width. Do not set heavy stones on stonework below until mortar has set sufficiently to support weight and prevent mortar from squeezing out of joints.
- M. Remove shims, if possible.
- N. When joints are thumbprint hard, rake back to 1-inch depth to allow for pointing mortar.
- O. Historic Reference Drawings
 - 1. Front & Side Elevations, 1906, Hornblower & Marshall, No. 152
 - 2. Section on North & South Axis, 1906, Hornblower & Marshall, No. 153
 - 3. Section on Northwest & Southwest Axis, 1906, Hornblower & Marshall, No. 154
 - 4. Section on North & South Axis of South Entrance, 1906, Hornblower & Marshall, No. 157
 - 5. ½" Scale Detail Showing Construction of Dome, 1908, Hornblower & Marshall, No. 319
 - 6. Dome Details (Shop Drawing), 1909, R. Guastavino Co., Sheet 14

3.5 REMOVE & REINSTALL LEAD T-CAPS AT ROTUNDA DOME (OPTION 2)

- A. Inspect areas where lead T-Caps are loose or missing by removing an area of 12" on both sides of the joint to verify if the remaining T Caps are secured.
- B. Remove and reinstall existing lead T-caps found to be poorly secured. Assume 100 for bidding purposes.

- C. Follow procedure as in Section 3.12

3.6 DUTCHMAN REPAIR

- A. After general cleaning has been completed, existing failed dutchman, spalls, or incipient spalls, to be removed using hand tools and brushes, vacuums, and water to remove any debris or dirt.
- B. Remove existing copper coping and flashings as required to access stones for repair. Provide temporary flashing over work area to prevent moisture penetration into the building. Install new copper coping flashing to match existing. See Section 07 6000.00 – Flashing and Sheet Metal
- C. Place stone dutchman in position and mark existing stone for cutting. Allow maximum 1/8-inch clearance around dutchman. Square-cut existing stone a minimum of four inches and remove existing piece. Where multiple spalls are clustered, Contractor shall, in consultation with COTR, install new large full face dutchman to minimize exposed joints.
- D. For dutchman over 36 square inches in size, dry-drill (air cooled) 1/2 inch diameter holes for pins, either grout or mechanical type, through surface into back up. Provide two pins per each square foot of dutchman. Dutchman of less than 12 square inches will not require anchors.
- E. Approval of area marked to be done by COTR.
- F. Cut out area to receive dutchman back to solid stone to a minimum of 4" back from face of surround stone depending on location.
- G. Use salvage stone for smaller dutchmen where possible.
- H. Cut dutchman slightly larger than the prepped area.
- I. Size the new dutchman and dry fit to ensure there is a tight joint between dutchman and existing stone.
- J. Depending on location and size, install blind anchored Type 304 stainless steel pins if needed anchored in approved epoxy. Pins to be installed at a minimum of 2" from edge of dutchman or stone and blind pin to be set allowing 1" of stone coverage from finished face of dutchman. 1 pin is usually installed per 12 square inches of surface area but could differ depending on size of dutchman.
- K. Dutchman to be set in mortar knife grade epoxy with all bonding surfaces fully coated. At exposed surfaces. Hold back epoxy 1/2" from the edge. Fill with mortar to help blend in the dutchman.
- L. Dutchman will be secured, shimmed, or supported in alignment until epoxy or mortar has cured.

- M. After epoxy or mortar has set, finish any areas that may need to be addressed in order to match surround stone taking care to not damage surrounding stone.
- N. All manufacturer procedures to be followed for epoxies used.

3.7 SETTING PINS

- A. Core hole of appropriate diameter using diamond core bit. Masonry bit in hammer-drill may be used if masonry unit measures over 12 inches in width. Drill hole to depth indicated on the Drawings.
- B. Clean holes with air blast or water jet to remove any particles, dust and dirt.
- C. Fill hole with specified anchor setting epoxy and twist new pin into hole. Clean overflow material immediately.
- D. Permit new pin to set undisturbed until adhesive is fully cured. Remove and replace pins disturbed before grout is fully cured.

3.8 GRANITE PATCHING MORTAR

- A. Install new Granite patching mortar where indicated by COTR.
- B. Thoroughly clean all surfaces to receive patching material as required to provide sound base per manufacturer instructions. Rinse thoroughly with clean water and bristle brush to remove all dust, dirt, grease, oil, or any other debris.
- C. Cut simple geometric shape around perimeter of repair area. Area shall be cut at edges with back-bevel cut to provide minimum 1/2" edge depth.
- D. On the prepared substrate, drill a series of holes to help key the patching material. Holes shall be placed approximately every 8" square and should go 2" into sound stone. Alternate directions of holes by drilling approximately 20 degrees off the face of substrate.
- E. After cleaning area to receive patch, soak area to be patched with water for a minimum of 24 hours. Allow to dry for 2 hours or until there is no standing water on surface of cleaned area. Surface shall be damp, but no standing water. Install slurry coat of patching compound into spall.
- F. Mix according to manufacture's instructions.
- G. Apply Jahn Patching to wet surface, with no pooling water; if surface is allowed to dry out before mortar is applied, repeat wetting.
- H. Build out Jahn Patching material further than surface of original substrate; after patching material achieves initial set, scrape away excess mortar until desired profile is attained. Do not feather edges.

- I. Keep Jahn patching moist by water-misting several times a day for 72-hour period.
- J. Where access to patches is not possible, cover patches temporarily with plastic sheeting; application of plastic sheeting does not alter requirements for normal curing techniques.
- K. Stain: If needed to match adjacent features of existing stone, compatible potassium silicate stain to be applied. Use a black potassium silicate stain stippled or lightly flecked onto surface with a stiff brush to mimic Mount Airy or Bethel Granite, based on approved test panels.

3.9 CRACK REPAIR

- A. After general cleaning has been completed, existing cracks shall be cleaned out using hand tools and brushes, vacuums, and water.
- B. Cleaned crack will be examined to determine its approximate width in order to make sure the correct grout will be used. Grout to be used will be based off of the crack's width.
- C. Cracks below 1/16" or cracks in ornamental areas or near an edge will be sounded and analyzed. If they are found to be loose or too fragile to conduct crack repair, removal and pinning the piece (dutchman) may be done instead of crack repair.
- D. All cracks should be sounded to determine if there are underlying conditions warranting further repair and brought to the attention of the COTR. For hairline cracks below 1/16" - if crack is determined to risk water penetration to the interior, crack repair may be warranted, otherwise, no additional action is required.
- E. Crack width and complexity will determine if porting is necessary. In general cracks that are narrower than 1/16th and inch will not be able to accept a syringe and will therefore need to be ported also particularly complicated cracks ie spider may also require porting.
- F. Use M31 Grout or approved equal for cracks 1/16" -1/8" wide.
- G. Use M32 Grout or approved equal for cracks 1/8"- 3/8" wide.
- H. For cracks larger than 3/8" wide, follow granite patching mortar execution.
- I. Drill ports in the center of the crack at a slightly downward angle.
- J. Seal cracks leaving the ports open only.
- K. Tape (non-staining tape that will not leave a residue) will be applied to both sides of the crack to prevent crack repair mortar from staining surrounding stone.
- L. Dampen stone in crack with clean water.

- M. Mix appropriate grout for the crack.
- N. Dampen stone in crack with clean water to ensure interior of crack is thoroughly damp to allow for the flow of the grout.
- O. Grout to be applied/installed starting at the lowest section that will allow grout to flow in slowing working way to top of crack.
- P. Inject grout using appropriate size syringe.
- Q. Grout to be filled flush with adjacent stone to either side of the crack.
- R. Any overflow to be cleaned up using a sponge and clean water.
- S. After initial set, grout to be finished to match texture of adjacent stone finish as close as possible.
- T. Grout to be periodically misted after application to ensure proper curing.
- U. All manufacturer's specified procedures to be followed.

3.10 REPOINTING

- A. Section 04 0140.62 – Masonry Repointing

3.11 REMOVAL OF LOOSE SCALE

- A. Where areas of loose or crumbly granite surfaces are noted, gently remove loose material down to sound surface using hand methods only.
- B. If loss is less than 1/2", no further action is required. If deeper loss, consult COTR to see if further patching or honing is required.

3.12 INSTALLATION OF LEAD T-CAPS & INSPECTION

- A. After general cleaning has been completed, skyward facing joints that are exposed to the elements will receive caulk and Lead T's where indicated on drawings.
- B. Lead T's will be primarily 1" depending on the size of the joint to ensure proper overlap of the joint.
- C. The joint will first be cut out and then prepped using a wire brush, brush and vacuum to remove all dust and debris to ensure proper bond between caulk and stone.
- D. Lead T will be cut and formed to fit joint and stone profile using snips to prevent aerosolizing lead. It will turn the edge to protect the front face of the joint and form a drip edge.
- E. Blue tape will be installed at edge of lead T to protect stone.

- F. Caulk will be installed in amount enough to fill joint and lock in lead T without overflowing out the sides of the T.
- G. Lead T will be installed flush to surface of stone and left undisturbed until caulk cures.
- H. Blue tape will be removed.

3.13 REGLET FOR NEW COPPER COPING

- A. Cut new 1-1/4" deep by 1/4" wide reglet 4" back from the outer face of the granite in all areas where new copper coping is to be installed.
- B. Install new reglet at building Facets B, F, G, N, O, and P after removal of existing copper coping.
- C. Stagger cuts at pilasters but do not cut reglet through exposed returns,
- D. Test fit sample cleat in all areas to ensure uniform depth of cut. Adjust as required to receive new cleat.
- E. Coordinate work closely with new copper flashing installer.

3.14 INSTALL NEW PARAPET CRAMPS

- A. Cramps are located at all parapets where copper coping cap is being removed and replaced,
- B. Remove existing rusted iron cramps and lead fill using mechanical means. Remove existing cramps prior to cutting stone for reglets or dutchman repairs.
- C. Fully clean out all mortar and lead residue from anchor holes. Enlarge as required to fit new cramp.
- D. Set new cramps fully bedded in new Type N mortar.
- E. Embed cramp fully in mortar and strike flush with the top surface of the stone. Allow mortar to cure fully before applying primer or installing coping underlayment.

3.15 CLEAN-UP

- A. Clean masonry not less than 6 days after completion of work, using clean water and stiff bristle fiber brushes. Do not use wire brushes, acid type cleaning agents, caustic or harsh cleaners, or other materials or methods that could damage installed masonry or adjacent painted surfaces, windows, or other building features.
- B. Remove debris from masonry restoration work from the site on a daily basis and at the completion of work. Do not let debris build-up on site. Do not permit debris to collect in drains.

END OF SECTION 04 0140.92

SECTION 07 0191 – JOINT SEALANT REHABILITATION AND REPLACEMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes installation of sealants at stone masonry as follows:
 - 1. Rehabilitation and replacement of exterior elastomeric weatherproofing sealants
- B. Other Sections of these Specifications that relate to the work of this Section include the following:
 - 1. Section 01 3591.00 – Historic Treatment Procedures.
 - 2. Section 04 0140.52 – Stone Cleaning.
 - 3. Section 04 0140.62 – Masonry Repointing
 - 4. Section 04 0140.92 – Stone Restoration
 - 5. Section 07 6000.00 – Flashing and Sheet Metal

1.3 REFERENCES

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCE STANDARDS

- A. In general, follow all requirements, recommendations, and procedures of the following standards and publications, except where these Contract Documents are more stringent.
 - 1. Smithsonian Directive 418, Smithsonian Institution Historic Preservation Policy.
 - 2. National Park Service, Preservation Brief #2, "Repointing Mortar Joints in Historic Masonry Buildings."
 - 3. Secretary of the Interior's Standards for the Treatment of Historic Properties.
 - 4. ACI 530 – Building Code Requirements for Masonry Structures.
 - 5. American Society of Testing and Materials (ASTM): Standards as specified or referenced herein.
 - a. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
 - b. ASTM C 920 - Specification for Elastomeric Joint Sealants.
 - c. ASTM C 1135 - Test Method for Determining Tensile Adhesion Properties of Structural Sealants
 - d. ASTM C 1184 - Standard Specification for Structural Silicone Sealants.
 - e. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
 - f. ASTM C 1248 - Test Method for Staining of Porous Substrate by Joint Sealants.
 - g. ASTM C 1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

- h. ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness.
 - i. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
- 6. Sealant, Waterproofing, and Restoration Institute (SWRI): www.swrionline.org
 - a. SWRI Validation Program.
- 7. U. S. Environmental Protection Agency (EPA): www.epa.gov
 - a. *40 CFR 59, Subpart D: National Volatile Organic Compound Emission*

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.
- B. Preinstallation Conference: Conduct a conference the Project Site.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of joint sealant product specified, including:
 - 1. Preparation instructions and recommendations.
 - 2. Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.
 - 3. Color samples for selection and verification of submittal requirements.
- B. Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and color, for each application. Utilize joint sealant designations included in this Section.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified applicator.
- B. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
- C. Preconstruction compatibility and adhesion test reports
- D. Preconstruction field-adhesion test reports
- E. Field quality control adhesion test reports.
- F. Warranty: Sample of unexecuted manufacturer and installer special warranties.

1.8 FIELD CONDITIONS

- A. Hazardous Materials: Testing has indicated that materials to be removed or rehabilitated may contain lead paint residues on third floor window frames.

1. The OSHA Lead in Construction Regulation, 29 CFR 1926.62, applies to all construction work where an employee may be occupationally exposed to lead.
2. Due to the presence of lead-containing paint at the Site, OSHA worker protection requirements for lead must be followed during renovation and/or demolition activities.
3. Removed sealant shall be assumed to have lead paint residues and disposed of in accordance with applicable regulations.
4. See also Asbestos-containing Materials & Lead-based Paint Survey Report, Smithsonian Institution National Museum of Natural History, January 2024

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Experienced Installer equipped and trained for application of joint sealants required for this Project with record of successful completion of projects of similar scope.
- B. Single Source Responsibility: Provide glazing sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- C. Preconstruction Field-Adhesion Testing: Prior to installing joint sealants, field test adhesion to joint substrates using ASTM C 1193 Method A or method recommended by manufacturer. Verify adhesion is adequate. Modify joint preparation recommendations for failed joints and re-test. Submit written report to COTR.
- D. Mockups: Provide sealant application within mockups required in other sections identical to specified sealants and installation methods. Mock-ups are required for each joint type and color. Mock-ups should be 5LF, each.
- E. Perform manufacturer's standard field adhesion test after the sealant is fully cured (usually within 7 to 21 days.) for each type of substrate condition as required to obtain manufacturer's warranty. Field adhesion testing should be documented using the Field Adhesion Testing Log and submitted to COTR. Provide 2 tests per elevation for each type of condition: stone to stone; stone to wood, stone to metal, etc.

1.10 WARRANTY

- A. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.
 1. Warranty Period for Silicone Sealants: 20 from years date of Substantial Completion.
- C. Warranty Conditions: Special warranties exclude deterioration or failure of joint sealants in normal use due to structural movement resulting in stresses on joint sealants

exceeding sealant manufacturer's written specifications, joint substrate deterioration, mechanical damage, or normal accumulation of dirt or other contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products listed below represent materials that will likely be used for sealants. This section assures quality of Work by listing regulatory language and by setting standards of quality for materials. Information from the testing shall guide product selection and restoration procedures.
- B. Order replacement materials at the earliest possible date to avoid delaying completion of the Work.

2.2 MANUFACTURER

- A. Basis-of-Design Product: Provide joint sealant products manufactured by The Dow Chemical Company, Midland MI; (877) SEALANT, (877) 732-5268; email: construction@dow.com; website: [dow.com/construction](https://www.dow.com/construction), [or comparable products of other manufacturer approved by COTR in accordance with Instructions to Bidders and Division 01 General Requirements].

2.3 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants and accessory materials that are compatible with one another, with joint substrates, and with materials in close proximity under use conditions, as demonstrated by sealant manufacturer by testing and related experience.
- B. Joint Sealant Standard: Comply with ASTM C 920 and other specified requirements for each liquid-applied joint sealant.
- C. Stain Test Characteristics: Where sealants are required to be nonstaining, provide sealants tested per ASTM C 1248 as non-staining on porous joint substrates indicated for Project.
- D. Existing window paint if required for touch-up: Benjamin Moore, Moore Craft Exterior 1474 B-2 (Cape May Cobblestone), Semi-Gloss finish

2.4 WEATHERPROOFING LIQUID SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant JS#1: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T, NT; SWRI validation.
 - 1. Basis of Design Product: DOWSIL™ 790 Silicone Building Sealant.
 - 2. Hardness, ASTM C 661: 15 durometer Shore A.
 - 3. Volatile Organic Compound (VOC) Content: 26 g/L maximum. Volatile Organic Compound (VOC) Content: 32 g/L maximum.
 - 4. Staining, ASTM C 1248: None on concrete, granite, limestone, and brick.
 - 5. Color: Per approved mockup

- B. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant JS#2: ASTM C 920, Type S, Grade NS, Class 50, for Use NT; SWRI validation.
 - 1. Basis of Design Product: DOWSIL™ 795 Silicone Building Sealant.
 - 2. Hardness, ASTM D 2240: 35 - 45 durometer Shore A, minimum.
 - 3. Volatile Organic Compound (VOC) Content: 32 g/L maximum.
 - 4. Staining, ASTM C 1248: None on concrete, marble, granite, limestone, and brick.
 - 5. Color: Per approved mockup

2.5 ACCESSORIES

- A. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
- B. Bond Breaker Tape: Polymer tape compatible with joint sealant materials and recommended by sealant manufacturer.
- C. Manufacturer's recommended primers and joint sealers.
- D. Touch up Paint: Benjamin Moore, Moore Craft Exterior 1474 B-2 (Cape May Cobblestone), Semi-Gloss finish

PART 3 - EXECUTION

3.1 EXAMINATION & INSPECTION

- A. Verify all site conditions and dimensions by field measurements. Notify the COTR immediately of any issues.
- B. Examination of Existing Joint Sealants: Examine existing joint sealants and indicate extent of joint sealant replacement and rehabilitation on shop drawings. Examine joints for compliance with requirements for joint configuration, installation tolerances, condition of joint substrate, and other conditions affecting joint-sealant performance.
- C. Preinstallation Testing: Perform preinstallation adhesion tests in accordance with manufacturer's instructions and with ASTM C 1193, Method A. Verify substrate preparation and priming result in adhesion of sealants meeting sealant manufacturer's published performance data.
 - 1. If adhesion does not comply with published data, modify preparation and priming in accordance with sealant manufacturer's written instructions and retest.
- D. Submit report indicating conditions that cannot be corrected to comply with joint sealant manufacturer's recommendations as part of the specified joint replacement or rehabilitation. Proceed with work once non-complying conditions are corrected.

3.2 PREPARATION

- A. Removal of Failed Joint Sealant Materials: Cut out and remove joint materials and associated backing materials as indicated on drawings [and identified during pre-installation conference].
 - 1. It is assumed that some wood substrate elements may contain lead paint residues. Removal and disposal plan for old sealant must include appropriate lead safe worker protection and disposal methods in compliance with applicable regulations.
- B. Surface Cleaning of Joint Substrates: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods in addition to solvent cleaning 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.
 - 3. Clean porous and nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

3.3 APPLICATION

- A. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
- B. Joint primer: If a primer is recommended following field adhesion tests, install compatible primer in accordance with manufacturer's instructions.
- C. Joint Backing: Select joint backing materials recommended by sealant manufacturer to be compatible with sealant material. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
 - 1. Install bond breaker tape over substrates when sealant backings are not used.
- D. Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths between 1/4 and 1/2 inch (6.4 and 12.7 mm) unless otherwise recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width

1. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
2. Using tooling agents approved by sealant manufacturer for application.

3.4 CLEANING

- A. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 1. Remove masking tape immediately after tooling joint without disturbing seal.
 2. Remove excess sealant from nonporous surfaces while still uncured.
 3. Paint Touch-up: Touch-up paint damaged during sealant removal process to match existing.

3.5 FIELD QUALITY CONTROL

- A. Retain testing agency to perform the following tests:
 1. Verification that substrate preparation meets requirements.
 2. Testing and certification that joint sealant materials comply with requirements.
 3. Testing of application for compliance with adhesion requirements.
- B. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C 1193, Method A.
 1. Perform [5] tests for the first [1000 feet (300 m)] of joint length for each kind of sealant and joint substrate, and one test for each [1000 feet (300 m)] of joint length thereafter or 1 test per each floor per building elevation, minimum.
 2. For sealant applied between dissimilar materials, test both sides of joint.
- C. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- D. Submit report of field adhesion testing indicating tests, locations, dates, results, and remedial actions taken.

3.6 EXTERIOR JOINT-SEALANT SCHEDULE

- A. Exterior movement joints in stone masonry and at cornices and joints between dissimilar materials (stone to metal flashings, etc.).
 1. Joint Sealant: Single-component neutral-curing non-staining silicone sealant JS#1.
 2. Joint-Sealant Color: Limestone, per approved mockup
- B. Exterior perimeter joints at frames of metal doors and windows.
 1. Joint Sealant: Single-component neutral-curing non-staining silicone sealant JS#2.
 2. Joint-Sealant Color: Limestone, per approved mockup

3. Multiple colors may be required to match several conditions.

END OF SECTION

SECTION 07 6000.00 – FLASHING & SHEET METAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes rehabilitation and replacement of copper flashing and sheet metal at parapets
- B. Other Sections of these Specifications that relate to the work of this Section include the following:
 - 1. Section 01 3591.00 – Historic Treatment Procedures.
 - 2. Section 04 0140.52 – Stone Cleaning.
 - 3. Section 04 0140.62 – Masonry Repointing
 - 4. Section 04 0140.92 – Stone Restoration
 - 5. Section 07 0190.81 – Joint Sealant Replacement

1.3 REFERENCES

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCE STANDARDS

- A. In general, follow all requirements, recommendations, and procedures of the following standards and publications, except where these Contract Documents are more stringent.
 - 1. Smithsonian Directive 418, Smithsonian Institution Historic Preservation Policy.
 - 2. National Park Service, Preservation Brief #2, "Repointing Mortar Joints in Historic Masonry Buildings."
 - 3. Secretary of the Interior's Standards for the Treatment of Historic Properties.
 - 4. ACI 530 – Building Code Requirements for Masonry Structures.
 - 5. American Society of Testing and Materials (ASTM): Standards as specified or referenced herein.
 - 6. Architectural Sheet Metal Manual – SMACNA, 5th Edition.
 - 7. Revere Copper Products, Inc. manual, "Copper and Common Sense."
 - 8. Product manufacturer's written instructions and recommendations.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate removal of existing flashing, installation of temporary protection, installation of new reglet and cleat, and final installation of new flashing with stone restoration trades.

- B. Preinstallation Conference: Conduct a conference at the Project Site.

1.6 UNIT PRICES

- A. No unit prices are associated with this section.
- B. See Division 1, Section 5 for Schedule of Unit Prices

1.7 SUBMITTALS

- A. Contractor qualifications.
- B. Submit the following items from the manufacturer.
 - 1. Submit a current copy of the pertinent referenced standards.
 - 2. Manufacturer's installation recommendations. Include the instructions and recommendations for all phases of work, including preparation of substrate, application of materials, weather limitations, and protection of installed material.
 - 3. Submit a statement from the manufacturer that product(s) to be used will be compatible with the different types of masonry surfaces where they will be used and that the material and process will not be in conflict with other products that will be used during the Work.
- C. Submit a schedule of work for approval by the COTR
- D. Submit shop drawings of new flashings at each unique location.
- E. Submit 12" x 12" samples of each type and weight of metal, rivets, nails, fasteners and solder.
- F. Submit 12" long sample of each type of metal joint required (e.g., lock and solder; lap, and solder; loose lock, etc.). Approved samples shall be the standard for joints to be used in the completion of the Work.
- G. Shop Drawings: Show manner of forming, joining, and securing sheet metal roofing, and pattern of seams along with details of construction and connections. Show waterproof connections to adjoining work.
- H. Submit a statement describing the qualifications of the firm and key personnel who will work on this project. Include the names and addresses of successful projects completed and for each, the name, address, and phone number of the owner and the architect.
- I. Submit a schedule of work for COTR's approval.
- J. Submit a Hot Work Plan for all soldering. The plan shall include the name of the person in charge of hot work safety for the contractor and will designate who maintains the hot work plan and ensures that hot work safety guidelines are implemented for all hot work activities. The plan will also include written verification of employees who are trained and authorized to conduct hot work operations and the names of those who are designated and trained as fire watch. The plan shall contain a description of anticipated site specific hot work activities and outline the process for obtaining SI hot work permits and ensuring conditions are in accordance with SI hot work permit requirements before hot work begins.

- K. Hot work permits will be issued daily by the Building Manager or Assistant Building Manager. Permits will not be issued more than 24 hours in advance of the start of hot work.

1.8 TEST PANELS

- A. The Contractor shall arrange for preparing test panels for flat and standing metal roof repair and new installation. Test panel should be chosen in discrete locations and should embody the conditions of the building as a whole. COTR shall approve locations of test panels.
- B. Installation of new flashing: Each 4' LF.
- C. Approved test panels will become a part of the Work, and serve as the quality standard for similar type work on this project. Additional test panels, up to a maximum of 3, shall be prepared if necessary to obtain satisfactory results at no additional cost to the Client.
- D. Notify the COTR 7 days in advance of the dates and times when test panels will be installed.

1.9 QUALITY ASSURANCE

- A. Contractor performing the Work shall have a minimum of 5 years' experience in the installation and repair of metal and slate roofs on historic buildings using specified methods, and shall have successfully completed at least 3 metal or slate roofing projects within the previous 3 years in accordance with the Secretary of the Interior's, "Standards for Rehabilitation."
- B. Installer performing the work of this Section shall have the capability and shop facilities to fabricate metal items specified in this Section and shall do all installation work with its own qualified personnel.
- C. Provide qualified personnel at all times during the execution of the Work of this Section, who shall be thoroughly familiar with the specified requirements, the approved materials, methods needed for their execution, and who shall direct all work performed under this Section.
- D. Provide adequate numbers of workers skilled in metal roofing.
- E. Provide products from a single source during the course of the work for consistency of quality and appearance.
- F. Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of the sheet metal manufacturer and Architectural Sheet Metal Manual by SMACNA, except that rivets and sealants are not allowed. Conform to dimensions and profiles shown.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with type and name of product and manufacturer.

1.11 PROJECT CONDITIONS

- A. Weather Conditions: Do not install material in rain, fog, or mist or when the relative humidity (RH) exceeds 75%. Do not commence application if rain is expected within 12 hours. Allow 12 hours after rain has occurred, and assure that surface is wind-dry before application begins.

- B. Should conditions change quickly, and there is a threat of inclement weather, provide temporary roofing for areas where new metal roof cannot be installed. Roof areas exposed to the weather during re-roofing work shall be protected during inclement weather, and at times when no work is being performed.
- C. Contractor shall be responsible for providing protection of the interior of the building from damage by weather. Contractor shall be responsible for repairs or replacement of interior materials damaged by weather at no additional cost to the Government.
- D. Protect masonry surfaces from staining from underlayment primer or soldering activities. Use fire blankets over masonry when soldering copperwork.
- E. Maintain protection in-place until completion of Work.
- F. Take appropriate precautions to avoid harm to building occupants, pedestrians and nearby property.
- G. Contractor shall be responsible for the repair of all damage to adjacent materials due to the execution of work at no additional expense to the Client. This includes damages to the interior of the building caused by infiltration of moisture to open roof areas. Repairs shall be made by qualified personnel, skilled in the type of repairs required, to the satisfaction of the Architect Conservator.
- H. Roof areas exposed to the weather during re-roofing work shall be protected during inclement weather, and at times when no work is being performed.

1.12 SEQUENCING AND SCHEDULING

- A. Order replacement materials at the earliest possible date, to avoid delaying completion of the Work.
- B. Coordinate work of this Section with interfacing and adjoining and related roofing work for proper sequencing of each installation.
- C. Coordinate work of this Section with replacement of deteriorated wood roof sheathing and framing, and masonry restoration work for proper sequencing of each installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products listed below represent materials that will likely be used. This section assures quality of Work by listing regulatory language and by setting standards of quality for materials. Information from the testing shall guide product selection and restoration procedures.
- B. Order replacement materials at the earliest possible date to avoid delaying completion of the Work.
- C. Temporary Protection Membrane: Use 45-mil polyester reinforced EPDM membrane to protect coping at roof edge while copper is removed for reglet installation and dutchmen repair. Use Carlyle Sure Tough EPDM Membrane or COTR approved equivalent. Use metal clamps, fastening plates, or wires at 3' o.c. to secure temporary membrane to existing standing seam and to scaffold deck.

- D. Flashing and counterflashing shall be 20-ounce (0.0216") cold rolled copper sheet H00 or H01 Temper in compliance with ASTM B370-22 Standard Specification for Copper Sheet and Strip for Building Construction
- E. Copper Cleats and Receiver: 24-ounce (0.0323") cold rolled copper sheet H00 or H01 Temper in compliance with ASTM B370-22 Standard Specification for Copper Sheet and Strip for Building Construction
- F. Solder for copper shall be 50 percent tin, 50 percent lead complying with ASTM B 32. Solder: Victory White Solder or COTR approved equivalent.
- G. Flux shall be muriatic acid killed with zinc, or approved commercial brand of flux, for lead coated copper. Note: thoroughly wash off all acid flux after soldering! Use LaCo M-A Flux or COTR approved equivalent.
- H. Epoxy for Securing Cleat in Reglet: 2-component, 100 % solids, solvent-free, moisture-tolerant, high-modulus, high strength, structural epoxy paste adhesive. It conforms to the current ASTM C-881, Types I and IV, Grade-3, Class-B/C and AASHTO M-235 specifications. Use Sikadur®-31 Hi-Mod Gel, or COTR approved equivalent.
- I. Roofing Underlayment: Use a high-tensile-strength, fully adhered, rubberized asphalt underlayment designed for high temperature applications. Use Carlyle WIP 300HT or COTR approved equivalent.
- J. Primer for Underlayment: Solvent-based, high-tack adhesives such as Carlyle CCW-702 or COTR approved equivalent.
- K. Rivets shall be "Pop" type, copper with solid brass mandrel, 1/8 inch (3 mm) diameter by 1/4 inch (6 mm) long; Trinity Group Fastening Systems, Inc., East Hanover, NJ, or approved alternate manufacturer.
- L. Nail-in Type Anchors: Use nail-in type anchors to secure cross seams well back (8"+) from edges. Use Hilti HPS-1 Impact Anchor or COTR approved equivalent.
- M. Miscellaneous Materials: Provide materials and types of fasteners, welding rods, protective coatings, separators, sealants and accessory items as recommended by sheet metal manufacturer and fabricator for metal roofing work, except as otherwise indicated.
- N. Accessories: Except as indicated as work of another specification Section, provide components required for a complete roof system, including trim, ridge closures, clips, seam covers, sealants, and closure strips. Match materials and finishes of roof.

2.2 APPLICATION EQUIPMENT

- A. General: For application of approved products, use only such equipment as is recommended for application of the cleaning product by the manufacturer, and as approved by the Architect Conservator.
- B. Other Materials: All other materials, not specifically described but required for a complete and proper installation of the Work of this Section, shall be new, first quality of their respective kinds, and as selected by the Contractor subject to the approval of the Architect Conservator.

2.3 FABRICATION

- A. Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of the sheet metal manufacturer and SMACNA Architectural Sheet Metal Manual, "Copper and Common Sense"; Revere Copper Products, Inc.", and other recognized industry practices. Fabricate for waterproof and weather-resistant performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrate. Comply with material manufacturer's instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated.
- B. Free edges of all sheet metal shall be hemmed or doubled back for stiffness or to engage cleats. No nails or other fasteners shall remain exposed in finished sheet metal work.
- C. Cleats & Receivers: Minimum width, 4 inches. Use 24-ounce material to resist wind uplift.
- D. Separations: Install copper coping over new fully adhered underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION & INSPECTION

- A. Verify all site conditions and dimensions by field measurements. Notify the COTR immediately of any issues.

3.2 TEMPORARY PROTECTION AND CONTROLS

- A. Provide temporary barricades and other forms of protection to effectively protect the building, tenant personnel, and the public from injury during course of Work. Contractor will be liable for all damage if temporary protection is not put in place.
- B. Provide the COTR with 72 hours written notice if Work activities have the possibility of affecting adjacent properties operation.
- C. Do not obstruct or store materials and equipment in streets or passageways without the written authority from the Owner, coordinate with Architect Conservator.

3.3 REMOVALS

- A. Carefully remove existing sheet metal coping at roof edge up to the standing seam. Unfold seams carefully to permit reuse. Do not disturb copper gutter or expansion joints. Remove any cleats, roofing nails, fasteners, and any underlayment. DO NOT LEAVE ANY NAILINS IN STONE AT COPING EDGE.
- B. Install temporary EPDM roof membrane secured to existing standing seam with clamps spaced at an interval of three feet, minimum. EPDM membrane should extend over the stone by two feet and be wired to scaffolding or to a mortar joint in the stone. Secure at three-foot intervals or as required to resist wind uplift and maintain a water-tight assembly.

- C. Note if any new or incipient spalls are noted near fasteners. Notify COTR of any spalls or incipient spalls found during inspection. Repair stone in accordance with Dutchman repair procedures.
- D. Notify COTR if any adverse conditions are observed with existing copper or slate roofing to remain.

3.4 PREPARATION

- A. Inspect the surfaces on which flashing and sheet metal is to be installed and make certain that they are in suitable condition to receive material before commencing work.
- B. Roofers shall wear rubber soled shoes. There shall be no unnecessary walking over the new sheet metal coping or existing roofing and no storing of materials on the coping or in the gutter.
- C. Coordinate metal coping installation with masonry repairs to maintain a permanently leakproof, secure, and noncorrosive installation.

3.5 GENERAL INSTALLATION

- A. Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being fabricated and installed.
- B. Comply with SMACNA's "Architectural Sheet Metal Manual." Allow for thermal expansion; set true to line and level. Install Work with laps, joints, and seams permanently watertight and weatherproof; conceal fasteners where possible.
- C. Roof-Edge Flashings: Secure metal flashings at roof edges to resist wind uplift.
- D. Sealed Joints: Form nonexpansion, but movable, joints in sheet metal to accommodate elastomeric sealant to comply with SMACNA standards.
- E. Fabricate nonmoving seams in sheet metal with flat-lock seams. Rivet joints for additional strength.
- F. Separations: Separate noncompatible metals or corrosive substrates with a coating of asphalt mastic or other permanent separation.

3.6 NEW COPPER CLEAT & RECEIVER

- A. Coordinate cutting of reglet with masons. Ensure that the reglet is cut to a uniform depth to permit proper installation of the cleat and receiver.
- B. Install new 24-ounce copper receiver into new 1-1/4" x 1/4" reglet cut into the top of the coping stone after all masonry repairs are completed and approved by COTR. Secure in slot with specified epoxy.
- C. Verify receiver is securely set into the stone.
- D. Rivet new 24-ounce copper cleat to the receiver in proper location to receive new coping flashing.

3.7 UNDERLAYMENT

- A. Apply adhesive by medium nap roller or brush in an even film at 300 to 350 square feet per gallon. Caution must be taken not to apply excess contact adhesive, which could cause longer drying times.
- B. Allow adhesive to flash off for a minimum of 75 minutes at 75°F.
- C. Adhesive has a satisfactory cure when surface is tacky, but will not transfer when touched.
- D. Apply only to areas to be waterproofed the same day. Reapply if the area becomes dirty or wet.
- E. Install copper cleat and receiver first and place underlayment on top of the drip edge so
3 10 and up onto the standing seam.
- F. Cut underlayment into 10–15' pieces.
- G. Remove 2–3' of release film and align the edge of the membrane, sticky side down, so
3 10
- H. Continue to remove release film and press as you move across the roof.
- I. Use a hand roller and/or hand pressure to press into place. Overlap end laps a minimum of 6".

3.8 NEW COPPER COPING FLASHING

- A. Install new 20-ounce copper cornice cover over new underlayment.
- B. Secure leading edge to new cleat and rear edge to existing standing seam. Double lock to existing copper gutter liner.
- C. At cross-seams, install new 3"-wide copper cleat with new 1-1/4" x 1/4" nail-in type anchors. Keep anchor locations at least 6" from face stone.
- D. Install new copper expansion joints close to existing locations.
- E. Test all copper work when completed to ensure water-tightness.
- F. Add new 20-ounce copper standing seam batten cap over existing lock seam where new copper coping cover locks into existing 30-ounce copper gutter. Secure with 2" copper straps at 24" o.c. locked into seam and soldered into place.

3.9 REPAIRING

- A. Repair or replace damaged work.
- B. Repair existing copper roof seams, expansion joints, seams, etc. are sound and water-tight where new work is tied into existing.

3.10 CLEAN-UP

- A. Keep work clean and free of stains and debris. Do not permit any debris from entering the drain lines.
- B. Remove waste material daily from the site and dispose of in authorized disposal area off campus.

- C. Dumpster may be used for daily storage of removed materials, but do not allow dumpster to become overfilled. Empty dumpster in legal disposal area off campus.
- D. Do not dispose of any debris or materials in Smithsonian dumpsters.
- E. Maintain area of work in a neat manner to prevent injury to personnel. Grounds shall be left neat and rake cleaned at the end of each working day.

3.11 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated will withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Completed sheet metal flashing and trim will not rattle, leak, or loosen, and will remain watertight.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements from ambient and surface temperature changes.
- D. Temperature Change (Range): 67° C (120° F), ambient; 100° C (180° F), material surfaces.

END OF SECTION