UNIVERSITY of MARYLAND BALTIMORE

ADMINISTRATION & FINANCE

DESIGN AND CONSTRUCTION

SPECIFICATIONS FOR THE RENOVATION OF DAVIDGE HALL ROOF REPLACEMENT

UNIVERSITY PROJECT # 19-366

100% SET CONSTRUCTION DOCUMENTS

OCTOBER 25, 2022 Office of Facilities Management Design and Construction

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Owner
University of Maryland, Baltimore
Design and Construction
Office of Facilities Management
620 W. Lexington Street, 6th Floor
Baltimore, Maryland 21201

Board of Public Works
Lawrence J. Hogan Jr., Governor
Peter Franchot, Comptroller
Nancy K. Kopp, Treasurer

Maryland General Assembly
William Ferguson, Senate President
Adrienne A. Jones, House Speaker

Architect
JMT | Architecture
Johnson, Mirmiran & Thompson, Inc.
40 Wight Avenue
Hunt Valley, MD 21030

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SECTION 010100 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project consists of the replacement of the dome and gable roofs.

1. Project Location: 520 W Lombard St, Baltimore, MD 21201
2. Owner: University of Maryland, Baltimore.

B. The Bid Set Documents, were prepared for the Project by Architect: JMT Architecture (Johnson, Mirmiran & Thompson, Inc.). 40 Wight Avenue, Hunt Valley, MD 21030.
   a. The drawings are dated 10-25-2022
   b. The specifications are dated 10-25-2022

C. The Work consists of the demolition of the existing cypress shingle roofing on the dome down to the sheathing, demolition of the existing flat panel terne coated stainless steel (TCS) roofing on the gable down to the sheathing, removal of the concealed copper gutters at the eave lines of the dome and gable roofs, removal and replacement of any damaged sheathing, installation of new curbs at the existing skylights on the gable roof, installation of ice and water shield underlayment, installation of a standing seam copper roof on the dome and gable, installation of new soldered copper flashing at the skylights, installation of new unit skylights above the existing skylights on the gable roof, and installation of new concealed copper gutters.

1.3 WORK SEQUENCE

1.4 CONTRACTOR USE OF PREMISES

A. General: During the construction period the Contractor shall have full use of the roof for construction operations. The contractor shall coordinate the areas of the site that the University can make available. Entrances and pedestrian ways to the entrances of Davidge Hall and the Dental Museum shall be maintained and protected.

B. Work hours: UMB has set the contractor's to be limited to Monday to Friday from 6:00am to 4:00 pm. Work can also be done on Saturday from 6:00am to 4:00 pm.

C. Use of the Site: Limit use of the premises to work in areas approved by the University. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. University Occupancy: Allow for University occupancy and use by the public.
2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the University, the University's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

D. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1.5 PROTECTION OF EXISTING CONSTRUCTION AND FURNISHINGS

A. The Contractor shall take all necessary precautions to protect the University's property and furnishings. The Contractor shall promptly remedy damage and loss to the University's property caused in whole or in part by the Contractor, a Subcontractor, a Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible.

END OF SECTION 010100

SECTION 010270 - APPLICATIONS FOR PAYMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

B. This Section specifies administrative and procedural requirements governing each prime contractor's Applications for Payment.

1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.

C. Related Sections: The following Sections contain requirements that relate to this Section.

1. Schedules: The Contractor's Construction Schedule and Submittal Schedule are specified in Division 1 Section "Submittals."

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
   a. Contractor's Construction Schedule.
   b. Application for Payment forms, including Continuation Sheets.
   c. List of subcontractors.

d. Schedule of allowances.
e. Schedule of alternates.
f. List of products.
g. List of principal suppliers and fabricators.
h. Schedule of submittals.

2. Submit the Schedule of Values to the University at the earliest possible date but no later than 7 days before the date scheduled for submittal of the initial Applications for Payment.

3. Sub-schedules: Where Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:
   a. Project name and location.
   b. University's Project number.
   c. Contractor's name and address.
   d. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division.
   b. Description of Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value.
   h. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

8. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications for payment as paid for by the University.

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

B. Refer to the University of Maryland Baltimore Standard General Condition of Construction for requirements and procedures governing applications for payment.

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

1. List of subcontractors.
2. List of principal suppliers and fabricators.
3. Schedule of Values.
4. Contractor's Construction Schedule.
5. Schedule of principal products.
6. Schedule of unit prices.
7. Submittal Schedule.
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of authorizations and licenses from governing authorities for performance of the Work.
11. Initial progress report.
12. Report of preconstruction meeting.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire the University's insurance.
16. Initial settlement survey and damage report, if required.

D. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for University occupancy of designated portions of the Work.
2. Administrative actions and submittals that shall precede or coincide with this application include:
    a. Warranties (guarantees) and maintenance agreements.
    b. Test/adjust/balance reports.
    c. Operation and Maintenance Manuals.
    d. Meter readings if appropriate.
    e. Startup performance reports.
    f. Commissioning Reports.
    g. Final cleaning.
    h. Application for reduction of retainage and consent of surety.
    i. Advice on shifting insurance coverages.
    j. Final progress photographs.
    k. List of incomplete Work, recognized as exceptions to University's Certificate of Substantial Completion.

E. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:

1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Substantial Completion.
3. Resolve all previously unsettled claims.
4. Resolve all previously incomplete Work.
5. Transmittal of required Project construction records to the University.
6. Proof that taxes, fees, and similar obligations were paid.
7. Removal of temporary facilities and services.
8. Removal of surplus materials, rubbish, and similar elements.
9. Change of door locks to University's access.

END OF SECTION 010270

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SECTION 010350 - MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 MINOR CHANGES IN THE WORK

A. The University will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time.

1.4 CHANGE ORDER PROPOSAL REQUESTS

A. University Initiated Change Order Proposal Requests: The University will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal requests issued by the University are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
2. Within a mutually agreed upon time period, submit an estimate of cost necessary to execute the change to the University for review.
    a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

Include required labor hours and unit costs, with totals for each labor category. Include all credits for deleted work.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts, for new work and deleted work.

c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor-Initiated Proposals: When latent or unforseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the University.

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities. Include required labor hours and unit costs, with totals for each labor category. Include all credits for deleted work.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts, for new work and deleted work.
4. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.

C. Proposal Request Form: Use forms provided by the Owner for Change Order Proposals. Sample copies are included at the end of this Section.

1.5 CHANGE ORDER PROCEDURES

A. Upon the University's approval of a Proposal Request, the University will issue a Change Order Requisition for signatures of the Contractor followed by a Notice to Proceed.

END OF SECTION 010350

SECTION 010400 – COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure required minimum accessibility for maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the University and sub-contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of CPM schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Work coordination meetings.
6. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and at each temporary telephone.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration until Substantial Completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.

15. Soiling, staining, and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High-speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 010400

SECTION 010450 - CUTTING AND PATCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 SUBMITTALS

A. Cutting and Patching Proposal: When unforeseen conditions require cutting and patching of the existing structure and/or related components the GC shall submit a cutting and patching proposal to the university, for review and approval before proceeding with any work. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required and indicate why it cannot be avoided. Include changes to the building's appearance and other significant visual elements if applicable.
2. Describe the products to be used.
3. Identify the impact to the project’s schedule and budget.
4. Indicate the dates when cutting and patching will be performed.
5. Where cutting and patching involves adding reinforcement to structural elements, the modifications to the structure shall be designed by a registered structural engineer. If the design team does not include a structural engineer the GC shall secure the services of an engineer to perform the required design. The GC shall submit the design drawings, details and engineering calculations showing integration of reinforcement with the original structure to the University.
6. Approval by the University to proceed with cutting and patching does not waive the University's right to later require complete removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

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

1. Obtain hot work permit from the University for cutting, burning, welding, etc. (See attached).
2. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
   a. Structural concrete.
   b. Structural steel.
   c. Lintels.
   d. Timber and primary wood framing.
   e. Structural decking.
   f. Miscellaneous structural metals.

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

1. Obtain approval of the cutting and patching proposal from the University before cutting and patching the following operating elements or safety related systems:
   a. Primary operational systems and equipment.
   b. Air or smoke barriers.
   c. Fire protection systems.
   d. Noise and vibration control elements and systems.
   e. Control systems.
   f. Communication systems.
   g. Electrical wiring systems.
   h. Operating systems of special construction.
   i. Fire rated assemblies.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the University's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner when directed by the University.

1. If possible, retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
   a. Firestopping.
   b. Stucco and ornamental plaster.
   c. Acoustical ceilings.

D. Cutting and Patching Responsibilities:

1. Cutting: cutting shall be the work of the trade requiring the cutting for access, or for permitting the alteration to be performed or an approved subcontractor designated by the trade or the GC.
   a. Cutting required for inspections shall be the work of the GC.
   b. Cutting required to obtain test samples of suspected hazardous materials shall be the work of a contractor licensed for the removal of hazardous materials.
2. Patching: Patching shall be the work of the appropriate trade.
   a. Maintain the rating of fire rated barriers, using approved sealant products.
3. Fire Rated Barriers: Where existing fire rated barriers, located in the project area, have unsealed openings for mechanical and electrical work, these openings shall be sealed using the approved sealant products to maintain the fire rating of the barrier.

1.5 WARRANTY

A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. For building exterior or visible interior elements, the Architect and the UMB representative must approve substitutions. Use materials whose installed performance will equal or surpass that of existing materials. Refer to applicable spec sections for materials.

PART 3 - EXECUTION

3.1 CONSTRUCTION WORK – EXCESSIVE NOISE

A. All construction work that creates excessive noise will not be permitted during normal business hours, 8:00am to 5:00pm (M-F) or 8:00am to 8:00pm (weekends). Work such as cutting masonry construction or other materials shall be scheduled between 5:00am and 8:00am (M-F) or 10:00pm to 8:00am (weekends). Coordinate actual time frames with UMB – Project Manager.

3.2 INSPECTION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

1. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.3 PREPARATION

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

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

C. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them or to take them out of service.

3.4 PERFORMANCE

A. General: Employ skilled workmen or experienced subcontractors to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the

subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.

1. In general, when cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Ensure all services have been de-energized or drained before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.5 PAINTING

A. Extent of Painting:

1. Paint over the entire surface plane, unless otherwise noted.

B. Appearance and Finish:

1. Appearance: Ensure painted surfaces do not present a spotty, touched-up appearance.
2. Finish: Provide a smooth continuous surface in texture, coverage and color.

3.6 CLEANING

A. Areas and spaces where cutting, and patching are performed shall be cleaned. Completely remove paint, mortar, oils, putty, and similar items.

END OF SECTION 010450

SECTION 010950 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic contract definitions are included in the Conditions of the Contract.

B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the University, requested by the University, and similar phrases.

D. "Approved": The term "approved," when used in conjunction with the University's action on the Contractor's submittals, applications, and requests, is limited to the University's duties and responsibilities as stated in the Conditions of the Contract.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar o perations.

G. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring,

applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.
2. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
    a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

J. “Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. “Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere,

and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on CSI's 16-Division format and UMB's Master format numbering system.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
   a. The words "shall be" are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for

minimum quantities or quality levels, comply with the most stringent requirement. Refer to the University before proceeding for a decision on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the University for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Co.'s "Encyclopedia of Associations," available in most libraries.

1.5 SUBMITTALS

A. Permits, Licenses, and Certificates: For the University's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

END OF SECTION 010950

SECTION 012000 - PROJECT MEETINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:

1. Preconstruction conferences.
2. Progress meetings.
3. Coordination meetings.

1.3 PRECONSTRUCTION CONFERENCE

A. The University shall schedule a preconstruction conference before starting construction, at a time convenient to the Contractor and the University, but no later than 15 days after execution of the Agreement. The conference will be held at a site identified by the University.

1. The University will conduct the meeting. Minutes will be recorded and distributed to participants in accordance with contract requirements.

B. Attendees: Authorized representatives of the University, and their consultants; the Contractor and its superintendent; major subcontractors; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress, including, but not limited to, the following:

1. Tentative construction schedule.
2. Critical work sequencing.
3. Designation of responsible personnel.

4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Procedures for processing Requests for Information (RFI's).
7. Procedures for processing University's Supplemental Instructions and Contract Clarification.
8. Distribution of Contract Documents.
9. Submittal of Shop Drawings, Product Data, and Samples.
10. Preparation of record documents.
11. Use of the premises.
12. Parking availability.
13. Office, work, and storage areas.
14. Equipment deliveries and priorities.
15. Safety procedures.
16. First aid.
17. Security.
18. Housekeeping.
19. Working hours.
20. Utility outages.
21. Testing.

1.4 PROGRESS MEETINGS

A. The Contractor shall schedule and administer bi-weekly progress meetings throughout the progress of work. The progress meetings will be held at a site identified by the University.

1. The Contractor will conduct the meeting, record minutes, and distribute copies to participants.

B. Attendees: In addition to representatives of the University and the Contractor, each subcontractor, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

1. Contractor's CPM Construction Schedule: Review progress since the last meeting. Determine status of each activity in relation to the Contractor's Construction Schedule, whether on time, ahead or behind schedule. Determine how construction behind schedule will be

expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time. Determine status of tasks on critical path. Identify additional tasks becoming critical due to delays.

2. Review the present and future needs of each entity present, including, but not limited to, the following:
   a. Interface requirements.
   b. Time.
   c. Sequences.
   d. Status of submittals.
   e. Deliveries.
   f. Off-site fabrication problems.
   g. Access.
   h. Site utilization.
   i. Temporary facilities and services.
   j. Hours of work.
   k. Hazards and risks.
   l. Housekeeping.
   m. Quality and work standards.
   n. Change Orders.
   o. Documentation of information for payment requests.
   p. Review submittal log.
   q. Review RFI log.
   r. Review Change Order log.
   s. Review upcoming outages, testing and inspections.

1.5 COORDINATION MEETINGS

A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

D. Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:

1. Contract Documents.
2. Options.
3. Related Change Orders.
4. Purchases.
5. Deliveries.
6. Shop Drawings, Product Data, and quality-control samples.
7. Review of mockups.
8. Possible conflicts.
9. Compatibility problems.
10. Time schedules.
11. Weather limitations.
12. Manufacturer's recommendations.
13. Warranty requirements.
14. Compatibility of materials.
15. Acceptability of substrates.
16. Temporary facilities.
17. Space and access limitations.
18. Governing regulations.
19. Safety.
20. Inspecting and testing requirements.
21. Required performance results.
22. Recording requirements.
23. Protection.

END OF SECTION 012000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Lump-sum allowances.

C. Related Requirements:

1. Section 012200 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.

1.3 DEFINITIONS

A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

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

1.7 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials, installation of the materials and shall include taxes**,** freight**,** and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered under allowance shall be included as part of the allowance.

1.8 PAYMENT AND ADJUSTMENT OF ALOWANCES

A. Payment of Allowances: The following procedures shall be utilized for payment of the allowances:

1. Quantities of each allowance shall be documented and forwarded to the Owner and Architect as they are used. These shall be reviewed and approved by the Architect.

2. At the submission of each Application for Payment, the total of each used portion of the allowance shall be included in the Application of Payment. The cost for the used portion of the allowance shall be based upon the unit cost for each allowance. This total cost for the used portion of the allowance shall be part of the total for each Application for Payment and will be subjected to the requirements of retainage and stored materials.

3. Upon completion of the project, retainage shall be paid for all used portions of the allowance and a change order shall be executed to return the cost of any unused portion of the allowance.

B. Allowance Adjustment: If the amount of the used portion of the allowance exceeds the amount include in the contract, prepare a Change Order proposal based on the difference between contract amount and the required amount of the allowance, multiplied by unit cost for the allowance.

1. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Quantity Allowance: Include 1,600 sq. feet of new board roof sheathing at the dome. This allowance shall include the removal and disposal of the damaged sheathing, and the purchase, handling and installation of the new materials.
   1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."
   2. This allowance includes Contractor overhead and profit.

B. Allowance No. 2: Quantity Allowance: Include 1,200 sq. feet of new 3/8” plywood roof sheathing at the gable roof. This allowance shall include the removal and disposal of the damaged sheathing, and the purchase, handling and installation of the new materials.
   1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."
   2. This allowance includes Contractor overhead and profit.

C. Allowance No. 3: Lump-Sum Allowance: Include 770 sq. feet of new ¾” plywood roof sheathing at the stepped dome base. This allowance shall include the removal and disposal of the damaged sheathing, and the purchase, handling and installation of the new materials.

1. This allowance includes material cost, receiving, handling, and installation, and Contractor overhead and profit.

C. Allowance No. 4: Lump-Sum Allowance: Include 1,000 square feet of brick masonry repointing for brickwork above the horizontal stucco band and the wood entablature. This allowance shall include scaffolding, dust protection, removal and disposal of the existing mortar, and the purchasing, handling and installation of the new mortar.
   1. This allowance includes the Contractor's overhead and profit.

D. Allowance No. 5: Lump-Sum Allowance: Include 500 square feet of brick replacement for brickwork above the horizontal stucco band and the wood entablature. This allowance shall include scaffolding, dust protection, removal and disposal of the existing mortar, and the purchasing, handling and installation of the new mortar.
   1. This allowance includes the Contractor's overhead and profit.

E. Allowance No. 6: Lump-Sum Allowance: Include complete sash replacement of 4 skylight sashes at the dome. This allowance includes field verification of dimensions and profiles to match the existing construction. It also includes removal of the existing sash, finishing and installation of the new sash.
   1. This allowance includes the Contractor's overhead and profit.

F. Allowance No. 7: Lump-Sum Allowance: Include replacement of 4 radial mullions and associated cross muntins at the circular skylight at the dome. This allowance includes field verification of dimensions and profiles to match the existing construction. It also includes removal of the existing skylight framing, finishing and installation of the new skylight, including glass.
   1. This allowance includes the Contractor's overhead and profit.

G. Allowance No. 8: Lump-Sum Allowance: Include replacement of 2 semicircular windows above the intermediate roofs at the base of the dome. This allowance includes field verification of dimensions and profiles to match the existing construction. It also includes removal of the existing skylight framing, finishing and installation of the new skylight, including glass.
   1. This allowance includes the Contractor's overhead and profit.

H. Allowance No. 9: Lump-Sum Allowance: Include complete removal and replacement of 550 square feet of stucco over existing masonry. This allowance includes finishing the stucco to match the existing texture and color.
   1. This allowance includes the Contractor's overhead and profit.

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.
2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

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

1.4 PROCEDURES

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

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

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Remove and replace board roof sheathing on the dome as documented in the Allowance section of the specifications.

1. Unit of Measurement: Square foot of sheathing removed and replaced.
2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

B. Unit Price No. 2: Remove and replace 3/8” plywood roof sheathing on the gable portion of the roof as documented in the Allowance section of the specifications.

1. Unit of Measurement: Square foot of sheathing removed and replaced.
2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

C. Unit Price No. 3: Remove and replace ¾” plywood roof sheathing on the stepped base portion of the dome as documented in the Allowance section of the specifications.

1. Unit of Measurement: Square foot of sheathing removed and replaced.
2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

D. Unit Price No. 4: Remove and replace mortar for brickwork above the horizontal stucco band and the wood entablature as documented in the Allowance section of the specifications.
   1. Unit of Measurement: Square foot of mortar removed and replaced.
   2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

E. Unit Price No. 5: Remove and replace damaged brick above the horizontal stucco band and the wood entablature as documented in the Allowance section of the specifications.
   1. Unit of Measurement: Square foot of brick removed and replaced.
   2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 “Allowance”.

END OF SECTION 012200

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SECTION 013000 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submittals by the Contractor as required by the contract documents.

B. Section includes:

1. Administrative requirements
2. Contractor’s review of submittals.
3. Architect’s review of submittals.
4. Product data submittals.
5. Shop drawing submittals.
6. Sample submittals.
7. Manufacturer’s Instructions
8. Reports of results of tests and inspections
9. Operations and Maintenance Data submittals
10. Certificates

C. Related Requirements:

1. Division Section “Substitution” for submitting substitution requests for products, materials, equipment, and methods of construction from those required.
2. Division 1 Section "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Division Section "Construction Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Division 1 Section "Construction Photographs" for construction photograph requirements.
5. Division 1 Section "Quality Control" for submitting test and inspection reports, and schedule of tests and inspections.
6. Division 1 Section "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
7. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
8. Division 1 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

9. Division 1 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals." Informational Submittals will be acknowledged.

C. Shop Drawings, Product Data and Samples: Instruments prepared and submitted by Contractor, for Contractor's benefit, to communicate to Architect the Contractor's understanding of the design intent, for review and comment by Architect on the conformance of the submitted information to the general intent of the design. Shop drawings, product data and samples are not Contract documents. Drawings, diagrams, schedules and illustrations, with related notes, are specially prepared for the Work of the Contract, to illustrate a portion of the Work.

D. Product Data: Standard published information ("catalog cut sheets") and specially prepared data for the Work of the Contract, including standard illustrations, schedules, brochures, diagrams, performance charts, instructions and other information to illustrate a portion of the work.

E. Samples: Physical examples that demonstrate the materials, finishes, features, workmanship or and other characteristics of a portion of the Work. Accepted samples shall service as quality basis for evaluation the Work.

F. Other Submittals: Technical data, test reports, calculations, surveys, certifications, special warranties and guarantees, operation and maintenance data, extra stock and other submitted information and products shall also not be considered Contract Documents but shall be information from Contractor to Architect to illustrate a portion of the Work for confirmation of understanding the design intent.

G. e-Builder: The University employs the e-Builder Construction Project Management System. The software enables members to manage work via a web based graphical interface. Owner will establish project specific page on e-Builder with project specific members. The site login address is https://app.e-builder.net/.

H. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

I. XLS: A file format created by Microsoft for use with Microsoft Excel which is a spreadsheet program that presents table of values arranged in rows and columns.

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Contractor shall prepare and submit a Submittal Schedule which lists submittal items per the product specifications for review and approval by the Architect. Contractor shall allow seven (7) days for Architect and University review. The Submittal Schedule shall identify all specified submittals to be made and shall serve as a checklist for submittals. Arrange the submittals in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Use the Comprehensive Project Submittal/Shop Drawing List (when provided) as a basis for submittals required to be submitted, including requirements for concurrent submittals and for complex submittals requiring additional review time by the Architect at Initial Review.
2. Coordinate Submittal Schedule with list of subcontracts, the Schedule of Values, and Contractor's construction schedule.
3. Format: Submit the Submittal Schedule using the Architect-provided Microsoft Excel file.
4. The first submittal shall be the Submittal Schedule. Architect reserves the right to withhold action on all submittals until complete submittal schedule has been submitted and approved.
5. Review of any submittal without submission and approval of submittal schedule does not relieve Contractor of responsibility to provide

Submittal Schedule for approval. Failure to submit Submittal Schedule relieves Architect of all constraints on review periods.

1.4 SUBMITTAL FORMATS

A. Assemble all Action Submittals for each specification section into a single package for delivery to Architect unless otherwise specified or agreed to during the Submittal Schedule review. Failure of Contractor to assemble all Action Submittals in single package may result in Architect withholding action on submittals(s) until associated submittals(s) required by applicable specification section are received.

1. Submit Product Data (as a separate submittal) before or concurrent with Shop Drawings and before or concurrent with Samples.
2. Closeout Submittals or Submittals for Work Performed by Separated Trades: Submit in separate package as applicable rather than in single Action Submittal package described above.
3. Submittals shall be processed electronically using e-Builder (with exceptions such as product and material samples as designated or approved by the Architect). Transmit all submittals from Contractor to Architect via e-Builder, unless otherwise directed. Submittals received from sources other than the Contractor will be returned without action. Include all information specified below for identification of submittals.

1.5 SUBMITTAL IDENTIFICATION

A. Submit each Submittal with a Submittal Identification Form, in a format developed with the Architect and acceptable to the University, including the following information for each submittal:

1. Project name and University project number.
2. Submission date.
3. Name and address of Architect.
4. Name and address of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier as applicable.
7. Unique submittal number, including revision identifier. Submittal number shall be identical to that listed in the approved Submittal Schedule.
8. Category (action or informational) and type of submittal (product data, test report, etc.).
9. Place for Contractor submittal approval certification, including name, date and signature.

10. Other necessary identification.
11. Submittals not including a Submittal Identification Form will be returned as "Not Reviewed".
12. At the contractor's option, multiple submittals for one specification section may be submitted and shall be coordinated and identified in the submitted and approved Submittal Schedule.

B. Identify each element in a submittal by reference to the Specifications article and paragraph, Drawing sheet number, detail, schedule, room number, assembly or equipment number, and or any other pertinent information that can be used to clearly correlate submittal with Contract Drawings. On the Submittal Identification Form, or on a separate transmission sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information submitted complies with requirement of the Contract Document.

C. Identify each submittal by Specification Section number followed by a number indicating sequential submittal for that Section. Resubmittals shall use same number as original submittal, followed by a letter indicating sequential resubmittal. For example only (not necessarily indicative of this project's materials):

D. For submittals including multiple individual items:

1. Identify each submittal by Specification Section number followed by the article title of the group of products submitted, followed by a number indicating sequential submittal for that Section. Resubmittals shall use same number as original submittal, followed by a letter indicating sequential resubmittal. For example only (not necessarily indicative of this project's materials):

2. In addition to requirements listed above include for each item the following:
   a. Easily identifiable Title Block with Number and title of Specification Section, with paragraph number and generic name for each of multiple items. For Example only (not necessarily indicative of this project's materials):

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E. Options: Identify options requiring selection by Architect.

F. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with the

submittal identification number and brief description, for example only (not necessarily indicative of this project's materials):

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections. Each submittal shall be one e-Builder item, and the Contractor may submit multiple items as one Package within a specification section. No Package may include submittals from multiple specification sections.

1. Use the eBuilder Submittal Module to create each submittal item. Persons entering submittals shall be trained by UMB on the eBuilder Submittal Module prior to entering the Submittal Schedule and any other submittals. Upload the pdf of the submittal directly to the e-Builder Submittal Module.
    a. Submitted file shall be a searchable PDF electronic file.
    b. Architect will return annotated (and flattened) file, incorporating Owner's comments. This file will be retained by UMB as the digital Project Record Document file.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows: Time for review shall commence on Architect's

receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the work to permit processing, including resubmittals.

1. Initial Review: Allow 15 working days for initial review of each submittal (which includes University's review) unless otherwise noted on the approved Submittal Schedule. Allow additional time if coordination with concurrent submittals is required. The Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Initial Review of Concurrent Submittals: Allow additional time if coordination with concurrent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
3. Initial Review of Complex Submittals: At the time of review and approval of the Submittal Schedule, the Architect will advise Contractor of certain submittals that are substantially complicated or require multiple reviewers and need an extended initial review time, including but not limited to, the following:
   a.
4. Resubmittal Review: Allow 15 days for review of each resubmittal.

D. Resubmittals: Make resubmittals in same form as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in Submittal Identification Form and clearly indicate extent of revision. Provide responses to Architect's review comments as appropriate to address concerns raised. Annotate the product data sheets, shop drawings, calculations, etc. to clearly indicate compliance with the original specification requirements and to demonstrate compliance with review comments.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Delegated Design Services Certification: In addition to other required submittals, submit digitally-signed PDF electronic file paper copies of certificate, signed and sealed by the responsible design professional.

F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.

G. Use for Construction: Establish and maintain access to eBuilder so that all submittals are available for use on Project site. Use only final action

submittals that are marked with approval notation from Architect's action stamp.

1.7 CONTRACTOR'S REVIEW OF SUBMITTALS

A. Contractor's Review of Submittals: Prior to submission to Architect for review, Contractor shall certify that submittals have been reviewed and approved. Note corrections and field dimensions. Mark each submittal with a uniform approval stamp including the name of the reviewer and the date of the Contractor's approval and sign each submittal. Submittals without stamp and signature will not be reviewed and will be returned. Electronic signatures are acceptable. Contractor's submittal approval shall certify the following actions by Contractor:
   1. Field measurements have been determined and verified.
   2. Conformance with requirements of Contract Drawings and Specification is confirmed.
   3. Catalog numbers and similar data are correct.
   4. Work being performed by various subcontractors and trades is coordinated.
   5. Field construction criteria have been verified, including confirmation that information submitted has been coordinated with the work being performed by others for the University and actual site conditions.
   6. All deviations from requirements of Drawings and Specifications have been identified and noted.
   7. All notes and dimensions by Contractor shall be in the color green.
   8. Submittals not certified by being stamped and signed by Contractor electronically on the Submittal Identification Form will be returned without action, as will submittals which, in the Architect's opinion, have not been adequately reviewed and coordinated by Contractor.

B. Changes in Work: Changes in the Work shall not be authorized by submittal review actions. No review action, implicit or explicit, shall be interpreted to authorize changes in the Work. Changes shall only be authorized by separate written direction from the University, in accordance with the Contract General Conditions.

1.8 REVIEW OF SUBMITTALS BY ARCHITECT AND UNIVERSITY

A. Review of Submittals by University and Architect: Submittals shall be a communication aid between Contractor and Architect by which interpretation of Contract Documents requirements may be confirmed in advance of construction.

1. Reviews by University, Architect and Architect's consultants shall be only for general conformance with the design concept of the Project and general compliance with the information given in the Drawings and Specifications.
2. The Architect's review shall not be construed as an "approval," or to relieve the Contractor(s) and material suppliers of responsibility for errors or omissions in the submitted documents.
3. Acceptance of a specific item does not include acceptance of the assembly of which the item is a component.
4. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly via the web-based software (e-Builder) system.

B. Architect's Review Action: Architect will mark each submittal with a uniform, self-explanatory action.
1. Submittal will be appropriately marked as follows to indicate the action taken:
   a. Action 1 (No Exceptions Taken) Means fabrication, manufacture, or construction may proceed providing submittal complies with Contract Documents.
   b. Action 2 (Make Corrections Noted): Means fabrication, manufacture, or construction may proceed providing submittal complies with Architect's notations and Contract Documents. The Architect may require a corrected resubmission for the File. (Note: If Contractor cannot comply with notations, make revisions and resubmit.)
   c. Action 3 (Rejected, Revise and Resubmit): Means submittal does not comply with design intent of Contract Documents. Do not use submittals stamped Action 3. Make revisions and resubmit.
   d. Action 4 (Rejected, Submit Specified Item): Means submittal varies from specified item or system specified in Contract Documents and is not acceptable for use on the project. Do not use submittals stamped Action 4. Make revisions and resubmit.
   e. Action 5 (No Action): Means documents have not been reviewed by Architect and submittal is returned to Contractor for several possible reasons: submittal not requested, submittal not complete, Submittal Transmittal form is not included, submittal not coordinated, or submittal bears no resemblance to design intent.
2. Do not permit submittals marked "Rejected, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

3. Note: Any work performed prior to receiving a fully approved submittal shall be done at the Contractor's risk and shall be subject to being replaced if Contract requirements are not met.

C. University's Review Action: The Architect will upload the reviewed submittal into eBuilder, and the status of the submittal will be indicated as appropriate in eBuilder. The University will review the submittal and coordinate comments with the Architect.

D. Final Review Action: The Architect will then incorporate final comments and upload the submittal in eBuilder for use by the Contractor, marking the final action for the submittal. The final action will be selected from the standard list in the eBuilder Submittal Module, as follows:
1. 1. No Exceptions Taken - Submission appears to comply with the CD's. Work can proceed.
2. 2a. Note Markings/Attachments - Submission will appear to comply with CD's when noted comments are incorporated. Work can then proceed.
3. 2b. Note Markings/Resubmit For Record – Submission will appear to comply with CD's when noted comments are incorporated. Work can then proceed. Resubmit corrected copy.
4. 3. Amend & Resubmit – Submission has deficiencies which cannot be easily be field corrected and does not comply with the CD's. Work cannot proceed. Amend & Resubmit.
5. 4. Submission has fundamental deficiencies and does not comply with CD's. Work cannot proceed. Resubmit.
6. 5. Received. No Action Required – Used for submittals which do not require review.

E. Contractor Action: The Contractor will be notified through eBuilder that the submittal is ready for his action. The Contractor shall incorporate all review comments and resubmit if so indicated by the eBuilder and Architect's actions and markings.

F. Contract Requirements:
1. Review actions by Architect and Architect's consultants shall not relieve the Contractor from compliance with requirements of the Contract Drawings and Specifications.
2. Acceptance of submittals with deviations shall not relieve Contractor from responsibility for additional costs of changes required to accommodate such deviations.
3. Deviations included in submittals without prior acceptance will be considered an exception from review of submittals whether noted or not on returned copy.

4. No review action, implicit or explicit, shall be interpreted to authorize changes in the Work. Changes shall only be authorized by separate written Change Order or Field Instruction, in accordance with the Contract General Conditions.
5. When professional certification of performance criteria of materials, systems or equipment is required by Contract Documents, the Architect shall be entitled to rely upon accuracy and completeness of such calculations and certifications.

G. Resubmittals:
Subject to same terms and conditions as original submittal.

1. UMB will not accept excessive resubmittals.
2. Should excessive resubmittals be required, Contractor may be subject to reimburse the University for Architect's accounts for time spent in processing additional resubmittals at their contractual hourly rate.

1.9 SUBMITTAL REQUIREMENTS

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

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data, and identify submittal separately from rest of Shop Drawings.
2. Mark each submittal to show which products and options are applicable Clearly indicate all aspects of the proposed items, including material selections and all options specified. Failure to indicate such details could result in the submittal being returned as incomplete.
3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams that show factory-installed wiring.
   b. Printed performance curves.

c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

B. Shop Drawings: Prepare and submit Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements as shown in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer if specified.

2. e-Builder: Submit one PDF copy of each submittal, capable of being printed as a full-size drawing.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Sample Identification: Permanently attach label on unexposed side of Samples that includes the following:
   a. Project name and submittal number.
   b. Generic description of Sample.
   c. Product name and name of manufacturer.
   d. Sample source.
   e. Number and title of applicable Specification Section.
   f. Specification paragraph number and generic name of each item.
3. Paper Transmittal: Provide paper transmittal and include complete submittal information indicated. Include image file illustrating Sample characteristics, and Sample Identification information for record.
4. e-Builder: Prepare paper transmittal in PDF form, and upload to website-Builder. Enter required data in site-Builder to fully identify submittal.

5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set\; remainder will be returned. Retain one returned Sample set as a project record Sample.
      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
   1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.

2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare and submit written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form,

indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   a. Name of evaluation organization.
   b. Date of evaluation.
   c. Time period when report is in effect.
   d. Product and manufacturers' names.
   e. Description of product.
   f. Test procedures and results.
   g. Limitations of use.
7. Corrective Action Report: Testing agency shall submit written documentation of any defects found and any corrective action taken, or proposed solutions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013000

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SECTION 013110 - SCHEDULES AND REPORTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
B. Division 1, Submittal Procedures, for requirements and submittal formats.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for schedules, reports, and critical path method scheduling required for proper performance of the Work, including:

1. Submittal schedule.
2. Schedule of inspections and tests.
3. Daily construction reports.
4. Material location reports.
5. Field correction reports.
6. Special reports.

1.3 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of schedules and reports with performance of other construction activities.

1.4 DEFINITIONS

A. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations determine when activities can be performed and the critical path of the Project.

B. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall project duration.

C. Network Diagram: A graphic diagram of a network schedule, showing the activities and activity relationships.

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

1. Critical activities are activities on the critical path.
2. Predecessor activity is an activity that must be completed before a given activity can be started.

E. Event: An event is the starting or ending point of an activity.

F. Milestone: A key or critical point in time for reference or measurement.

G. Float is the measure of leeway in activity performance. Accumulative float time belongs to the University.

1. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.

1.5 QUALITY ASSURANCE

A. The Contractor's Consultant: Retain a consultant to provide planning, evaluating, and reporting by CPM scheduling.

B. The Consultant shall be a recognized specialist, acceptable to the University, who is an expert in CPM scheduling and reporting.

C. The Consultant shall have computer facilities that are capable of delivering detailed network diagrams within 48 hours of request.

D. In-House Option: The University may waive the requirement to retain a consultant if the Contractor can demonstrate that:

1. The Contractor has the computer equipment required to produce CPM network diagrams.
2. The Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques.

E. Program: Use a computer software program for network analysis that has been developed specifically to manage CPM construction schedules and is acceptable to the University.

F. Standards: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

1.6 PRELIMINARY NETWORK DIAGRAM

A. Preliminary Network Diagram: Submit a preliminary network diagram within fourteen (14) days of the Notice to Proceed. The preliminary network diagram shall outline activities for the first sixty (30) days of construction. Include a skeleton diagram for the remainder of the Work with the preliminary diagram.

1. Include each significant construction activity. Coordinate each activity in the network with other activities. Schedule each construction activity in proper sequence.
2. Indicate completion of the Work on the date established for Substantial Completion, unless the University agrees otherwise.

B. Cash Requirement Prediction: With submittal of the preliminary network diagram, include a preliminary cash requirement prediction based on indicated activities.

C. Distribution: Distribute the preliminary network diagram to parties involved in construction activities that are scheduled early, including the University and the University.

1.7 CPM SCHEDULE

A. Prepare the Contractor's Construction Schedule using the network analysis diagram system known as the critical path method (CPM). Follow procedures outlined in AGC's "Construction Planning & Scheduling."

1. Proceed with preparation of the network diagram immediately following Notice to Proceed.
2. Follow the steps necessary to complete development of the network diagram in sufficient time to submit the CPM Schedule so it can be accepted for use no later than sixty (30) days after commencement of the Work.
3. Conduct educational workshops to train and inform key project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
4. Establish procedures for monitoring and updating the CPM Schedule and for reporting progress. Coordinate procedures with progress

meeting and payment request dates. Use "one working day" as the unit of time.

B. CPM Schedule Preparation: Prepare a list of all activities involved in the Project. Include a list of activities required to complete the Work. No single activity shall exceed fifteen (15) work days. Provide the best data available for generation of the network diagram and the CPM Schedule.

1. Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities.
2. Indicate estimated times for the following activities to be performed:
   a. Preparation and processing of submittals.
   b. Purchase of materials.
   c. Delivery.
   d. Fabrication.
   e. Installation.
3. Treat each story or separate area as a separate numbered activity for principal elements of the Work.
4. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

C. Processing: Enter prepared data on the processing system. Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM Schedule within the limitations of Contract Time.

D. Format: Display the full network on a single sheet of stable transparency, or other reproducible media, of sufficient width to show data clearly for the entire construction period.

1. Mark the critical path. Locate the critical path near the center of the network; locate paths with the most float near the edges.
2. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

E. Initial Issue: Prepare the initial issue of the CPM Schedule network diagram from a listing of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports to show the following:

1. The Contractor or subcontractor and Work or activity.
2. Description of the activity.
3. Principal events of that activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.

6. Early and late finish dates.
7. Activity duration in working days (maximum limit is fifteen (15) work days for construction activity).
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the Schedule of Values).

F. Value Summaries: Prepare two (2) cumulative value listings, sorted by finish dates.

1. In first listing, tabulate the following:
   a. Activity number.
   b. Early finish date.
   c. Dollar value.
   d. Cumulative dollar value.
2. In second listing, tabulate the following:
   a. Activity number.
   b. Late finish date.
   c. Dollar value.
   d. Cumulative value.
3. In subsequent issues of both listings, substitute actual finish dates for activities completed as of listing date.
4. Prepare listing for ease of comparison with payment requests; coordinate timing with progress meetings.
   a. In both value summary listings, tabulate "actual percent complete," and "cumulative value completed" with total at bottom.
   b. Submit value summary printouts following each regularly scheduled progress meeting.

1.8 CPM SUBMITTALS

A. Submittal and Distribution: Submit three (3) copies of the initial issue of the tabulations and network to the University for acceptance. When authorized, distribute copies to the separate contractors, subcontractors and suppliers or fabricators, and others identified by the Contractor with a need-to-know schedule responsibility.

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

3. Submit copies of each computer-produced report to the University.

B. Schedule Updating: Revise the schedule immediately after each meeting or other activity, where revisions have been recognized or made. Issue the updated schedule at each project meeting and submit with application for payment. Requests for payment will not be made without an updated CPM schedule.

1.9 SUBMITTAL SCHEDULE

A. After development and acceptance of the Contractor's CPM Schedule, prepare a complete schedule of submittals. Submit the schedule within ten (10) days of the date required for submittal of the Contractor's CPM Schedule.

1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values and the list of products as well as the Contractor's Construction Schedule.

B. Prepare the schedule in chronological order. Provide the following information:

1. Scheduled date for the first submittal.
2. Related Section number.
3. Submittal category.
4. Name of the subcontractor.
5. Description of the part of the Work covered.
6. Latest scheduled date for the University’s review/approval.

C. Distribution: Upon final approval of the University, print and distribute copies to the University, University, subcontractors, and other parties required to comply with submittal dates indicated.

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

D. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.10 SCHEDULE OF INSPECTIONS AND TESTS

A. Prepare a schedule of inspections, tests, and similar services required by the Contract Documents. Submit the schedule within thirty (30) days of the date established for commencement of the Work.

B. Form: The schedule shall be in tabular form and shall include, but not be limited to, the following:
   1. Specification Section number.
   2. Description of the test.
   3. Identification of applicable standards.
   4. Identification of test methods.
   5. Number of tests required.
   6. Time schedule or time span for tests.
   7. Entity responsible for performing tests.
   8. Requirements for taking samples.
   9. Unique characteristics of each service.

C. Distribution: Distribute the schedule to the University, and each party involved in performance of portions of the Work where inspections and tests are required.

D. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.11 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at the site. Submit duplicate copies to the University at weekly intervals:

   1. List of subcontractors at the site.
   2. List of separate contractors at the site.
   3. Approximate count of personnel at the site.
   4. High and low temperatures, general weather conditions.
   5. Accidents.
   6. Meetings and significant decisions.
   7. Unusual events (refer to special reports).
   8. Stoppages, delays, shortages, and losses.
   9. Meter readings and similar recordings.
   10. Emergency procedures.

11. Orders and requests of governing authorities.
12. Change Orders received, implemented.
13. Services connected, disconnected.
14. Equipment or system tests and startups.
15. Partial Completions, occupancies.
16. Substantial Completions authorized.

B. Material Location Reports: At weekly intervals, prepare a comprehensive list of materials delivered to and stored at the site. The list shall be cumulative, showing materials previously reported plus items recently delivered. Include with the list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from the site. Submit copies of the list to the University at weekly intervals.

1.12 SPECIAL REPORTS

A. General: Submit special reports directly to the University within one day of an occurrence. Submit a copy to other parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at the site, prepare and submit a special report. List the chain of events, persons participating, response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the University in advance when such events are anticipated or predictable.

END OF SECTION 013110

SECTION 013800 - CONSTRUCTION PHOTOGRAPHS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
B. Division 1, Submittal Procedures, for requirements and submittal formats.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for construction photographs for the following types of projects:

1. Campus renovation projects.

1.3 GC REQUIREMENTS

A. The GC shall make arrangements to have a series of construction photographs taken of the construction site utilizing their personnel with a digital camera.

B. The GC shall maintain an up-to-date electronic file of the photographs in numerical order per month in an XL spread sheet format as follows:

1. The XL spread sheet shall include a header with the UM Project Name and Project Number. Under the header include columns for “Photo #”, “Date” “Location on Project Site”, “View of the Photo” “Description” and “Photograph”. For Example:

a. Photo #1
b. 19-385
c. Corridor 107
d. Looking North
e. Ceiling Condition
f. Photograph

1.4 SUBMITTALS

A. Monthly: Submit construction photographs, electronically, in "pdf" file format to the University Project Manager (PM) monthly with the application for payment.

1. Organize the electronic "pdf" files as indicated in paragraph 1.3 above.
2. Pre-construction photographs shall be submitted with the first application for payment.

1.5 PHOTOGRAPHIC REQUIREMENTS

A. The GC shall take a series of construction photographs to document conditions at the project site and during various stages of construction as follows:

1. Pre-Construction Photographs: Prior to the start of construction take photographs of the project site and adjacent areas as follows:

a. New Projects: Take photographs in sufficient number to show existing conditions adjacent to the work areas before starting work. Where applicable, take photographs of existing buildings either on or adjoining the property in sufficient detail to record accurately the physical conditions at the start of construction.

b. Campus Renovation Projects: Take photographs in sufficient number to show existing conditions adjacent to the work areas, to indicate pre construction damage to existing walls, partitions, insulation, previous work that was not completed, and/or missing materials before starting work.

2. Construction Progress Photographs:

a. Take project photographs, in accordance with requirements indicated, to best show the status of construction and progress since taking previous photographs.

b. Frequency: Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment.

c. Vantage Points: Comply with the University's directions concerning desired vantage points for shots.

3. Record Photograph Files:

a. At the end of the project submit a complete set of record photographs, organized in XL spread sheets on a CD-R in a full size jewel case to the University. Label the CD-R and the jewel case with the UM project, UM Project Number, contents on the CD, and the submission date.

4. Post Construction Photographs:

a. After the project has completed if the A/E, the GC, and/or other contractors would like to have a series of post construction photographs taken of the project site they must submit a written request to the University PM. The PM will contact the contact the appropriate University representatives to gain approval and the set up a time for the photographs to be taken. Post construction photographs will not be allowed without the approval of the end usurer or their representative.

END OF SECTION 013800

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SECTION 014000 - QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality-control services.

B. Quality-control services include inspections, tests, and related actions, including reports, performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by the University.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

1.3 SUBMITTALS

A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the University. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
    a. Date of issue of report.
    b. Project title and number.
    c. Name, address, and telephone number of testing agency.
    d. Dates and locations of samples and tests or inspections.
    e. Names of individuals making the inspection or test.

f. Designation of the Work and test method.
g. Identification of product and Specification Section.
h. Complete inspection or test data.
i. Test results and an interpretation of test results.
j. Ambient conditions at the time of sample taking and testing.
k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
l. Name and signature of laboratory inspector.
m. Recommendations on retesting.

1.4 QUALITY ASSURANCE

A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 014000

SECTION 015000 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Temporary utilities include, but are not limited to, the following:

1. Water service and distribution.
2. Temporary electric power and light.
3. Temporary heat.
4. Ventilation.
5. Telephone service.
6. Sanitary facilities, including drinking water.

C. Support facilities include, but are not limited to, the following:

1. Field offices and storage sheds.
2. Temporary enclosures.
3. Temporary project identification signs and bulletin boards.
4. Waste disposal services.
5. Rodent and pest control.
6. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities include, but are not limited to, the following:

1. Field offices and storage sheds.
   Temporary fire protection.
   Barricades, warning signs, and lights.

2. Environmental protection.

1.3 SUBMITTALS

A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

B. Implementation and Termination Schedule: Within 15 days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.4 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, fire department, and rescue squad rules.
5. Environmental protection regulations.

B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

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

1.5 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest

feasible time, when acceptable to the University, change over from use of temporary service to use of permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. If acceptable to the University, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

Lumber and Plywood:

1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.
3. For fences and vision barriers, provide minimum 3/8-inch- (9.5-mm-) thick exterior plywood.
4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch- (16-mm-) thick exterior plywood.

B. Gypsum Wallboard: Provide gypsum wallboard on interior walls of temporary offices.

C. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary offices, shops, and sheds.

D. Paint:

1. For job-built temporary offices, shops, sheds, fences, and other exposed ber and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.
2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
   a. All signage must be submitted to and approved by the UMC Campus Environment Committee.
3. For interior walls of temporary offices, provide 2 coats interior latex-flat wall paint.

E. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of fifteen (15) or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

F. Water: Provide potable water approved by local health authorities.

G. Open-Mesh Fencing: Provide 0.120-inch- (3-mm-) thick, galvanized 2 inch (50-mm) chain link fabric fencing six (6) feet (2 m) high with galvanized barbed-wire top strand and galvanized steel pipe posts, 1-1/2 inches (38 mm) I.D. for line posts and 2-1/2 inches (64 mm) I.D. for corner posts.

2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the University, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Water Hoses: Provide 3/4-inch (19-mm), heavy-duty, abrasion-resistant, flexible rubber hoses one hundred (100) feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach

areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

G. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.

H. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

I. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

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

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Coordinate with the University Operations and Maintenance Personnel to install temporary service or connect to existing service. Provide all necessary labor, materials and equipment for connections.

1. Coordinate with the University for a time when service can be interrupted, if necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
3. Obtain easements to bring temporary utilities to the site where the University's easements cannot be used for that purpose.
4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the University. The University will not accept cost or use charges as a basis of claims for Change Orders.

B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

1. Sterilization: Sterilize temporary water piping prior to use.

C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.

1. Install electric power service underground, except where overhead service must be used.
2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.

1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

E. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

F. Heating Facilities: Except where the University authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control.

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

G. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.

1. Separate Telephone Lines: Provide additional telephone lines for the following:
   a. Where an office has more than two (2) occupants, install a telephone for each additional occupant or pair of occupants.
   b. Provide a dedicated telephone line for a fax machine in the field office.
   c. Provide a separate line for the University's use.
2. At each telephone, post a list of important telephone numbers.

H. Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.

I. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

1. Provide separate facilities for male and female personnel.

J. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

1. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

3.3 SUPPORT FACILITIES INSTALLATION

A. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.

1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the University.

B. Provide incombustible construction for offices, shops, and sheds located within the construction area or within 30 feet (9 m) of building lines. Comply with requirements of NFPA 241.

C. Field Offices: Provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:

1. Furnish with a desk and chairs, a four (4) drawer file cabinet, plan table, plan rack, and a six (6) shelf bookcase.
2. Equip with a water cooler and include a table and chairs for progress meetings, private toilet complete with water closet, lavatory, and medicine cabinet unit with a mirror.

D. Storage and Fabrication Trailers: Install storage and fabrication trailers sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service.

E. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.

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

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of twenty five (25) sq. ft. (2.3 sq. m) or less with plywood or similar materials.
3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
4. Where temporary wood or plywood enclosure exceeds one hundred (100) sq. ft. (9.2 sq. m) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.

G. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.

H. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of

combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80ºF (27ºC). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the University. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
   Store combustible materials in containers in fire-safe locations.
2. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Smoking is not permitted anywhere on project sites.
3. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

B. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

C. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.

D. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or

the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
Provide open-mesh, chainlink fencing with posts set in a compacted mixture of gravel and earth.

E. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

F. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 OPERATION, TERMINATION, AND REMOVAL

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

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a twenty four (24) hour basis where required to achieve indicated results and to avoid possibility of damage.
2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the University requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractor's property. The University reserves the right to take possession of project identification signs.
2. Remove temporary paving not intended for or acceptable for in the University's opinion, integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.
3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
    a. Replace air filters and clean inside of ductwork and housings.
    b. Replace significantly worn parts and parts subject to unusual operating conditions.
    c. Replace lamps burned out or noticeably dimmed by hours of use.

END OF SECTION 015000

SECTION 016000 - MATERIALS & EQUIPMENT, DELIVERY, STORAGE & HANDLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
    a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
    b. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.

2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 SUBMITTALS:

A. All submittals shall comply with the requirements in the “SUBMITTALS” section.

1.5 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the University to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:

1. No available domestic product complies with the Contract Documents.
2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.

D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
   a. Name of product and manufacturer.
   b. Model and serial number.
   c. Capacity.
   d. Speed.
   e. Ratings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with Contract Documents that are undamaged and new at time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and intended use and effect.
2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Where products are accompanied by the term as selected, University will make selection.
4. Where products are accompanied by the term match sample, sample to be matched is University's.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. General Compliance Requirements: Compliance requirements for individual products, as indicated in Contract Documents, are multiple in nature and may include generic descriptions, performance requirements, compliance with reference standards, conformance with graphic details and other similar forms and methods of indicating requirements, all of which must be complied with.

C. Procedures for Selecting Products: Contractor's options for selecting products are limited by Contract Document requirements, and are not controlled by industry traditions or procedures experienced by Contractor on previous construction projects.

D. Products specified by Reference Standards, Codes and Regulations: Select from among products which can be shown to comply to referenced documents.

E. Products specified by Naming Products and Manufacturers: Select from among products listed.

F. Products specified by Naming One Manufacturer's Product as the Basis-of-Design with Reference to Other Manufacturers: Select either the specified Basis-of-Design product or an approved comparable product by one of the other named manufacturers.

1. Comply with provisions in Comparable Products Article to obtain approval for use of a comparable product by one of the named manufacturers.

G. Products specified by Naming One Manufacturer's Product and Indicating Option of Selecting Comparable Products by stating or Approved Equivalent or similar language: Select either the specified product or an approved comparable product.

1. Comply with provisions in Comparable Products Article to obtain approval for use of an unnamed comparable product by another manufacturer.

H. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches University's sample. University's decision will be final on whether proposed product matches satisfactorily.

I. Visual Selection Specification: Where Specifications include the phrase as selected from manufacturer's standard colors, patterns, textures or similar phrase, select a product that complies with other specified requirements. University will select color, pattern, and texture.

1. Standard Range: Where Specifications include the phrase standard range of colors, patterns, textures or similar phrase, University will select color, pattern, or texture from manufacturer's product line that does not include premium items.
2. Full Range: Where Specifications include the phrase full range of colors, patterns, textures or similar phrase, University will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Where Basis-of-Design products are specified by name, submit the following, in addition to other required submittals, to obtain approval of a comparable product by one of the named manufacturers:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with the Basis-of-Design product in the Specifications. Significant qualities include

attributes such as performance, weight, size, durability, serviceability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Universities, if requested.
5. Samples, if requested.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

B. Install products in accordance with the execution’s sections of the Project Manual.

END OF SECTION 016000

SECTION 016310 - SUBSTITUTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

B. Contractor's submittal and University's acceptance of Shop Drawings, Product Data, or Samples not complying with Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval. Substitutions not properly authorized may be considered defective.

1.3 DEFINITIONS

A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:

1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
2. Revisions to the Contract Documents requested by the University or University.
3. Specified options of products and construction methods included in the Contract Documents.
4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: The University will consider requests for substitution if received within sixty (30) days after issuance of Notice to Proceed. Requests received more than sixty (30) days after issuance of Notice to Proceed may be considered or rejected at the discretion of the University.

1. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the University and separate contractors, that will be necessary to accommodate the proposed substitution.
    b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
    c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
    d. Samples, where applicable or requested.
    e. A statement indicating the substitution's effect on the Contractor's CPM Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
    f. Cost information, including a proposal of the net change, if any in the Contract Sum.
    g. The Contractor's certification that the proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
    h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
    i. Confirmation that the same warranty will be furnished for substitute product as for specified product.

1.5 UNIVERSITY'S ACTION

A. University will review and take appropriate action upon Contractor's request for substitutions.

1. University's action will be taken with reasonable promptness, while allowing sufficient time in University's professional judgement to permit adequate review.
2. University shall be entitled to rely upon adequacy, accuracy, and completeness of data, and certifications prepared by Contractor.
3. If necessary, University will request additional information or documentation for evaluation after initial review of receipt of request for substitution.

END OF SECTION 016310

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SECTION 017000 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
B. Division 1 “Submittal Requirements” for requirements for submittal formats.

1.2 SUMMARY

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

1. Inspection procedures.
2. Project record document submittal, including the following:
3. Marked-up copies of Contract Drawings.
4. Marked-up copies of Shop Drawings.
5. Newly prepared drawings.
6. Marked-up copies of Specifications, addenda, and Change Orders.
7. Marked-up Product Data submittals.
8. Record Samples.
9. Field records for variable and concealed conditions.
10. Record information on Work that is recorded only schematically.
11. Operation and maintenance manual submittal.
12. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
13. Preparing and submitting instruction manuals covering the care, preservation, and maintenance of University products and finishes.
14. Instruction of the University's operating personnel in the operation and maintenance of building systems and equipment.
15. Submittal of warranties.
16. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections the specifications.

C. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and antipollution regulations.

1. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

D. Maintenance of Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition. Make documents and Samples available at all times for the University's inspections.

E. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the University.

B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the University.

1.4 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written

endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the University has benefited from use of the Work through a portion of its anticipated useful service life.

D. University's Recourse: Expressed warranties made to the University are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the University can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The University reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the University reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
   a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
   b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
2. Advise the University of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

4. Obtain and submit releases enabling the University unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra stock, and similar items, including inventory list.
7. Make final changeover of permanent locks and transmit keys to the University. Advise the University's personnel of changeover in security provisions.
8. Complete startup testing of systems and instruction of the University's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
9. Complete final cleanup requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred, exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the University will either proceed with inspection or advise the Contractor of unfilled requirements. The University will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The University will repeat inspection when requested and assured that the Work is substantially complete.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.6 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

3. Submit a certified copy of the University's final punch list of items to be completed or corrected, endorsed and dated by the University. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and will be endorsed and dated by the University.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the University took possession of and assumed responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure: The University will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the University.

1. Upon completion of reinspection, the University will prepare a certificate of final acceptance. If the Work is incomplete, the University will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, reinspection will be repeated.

1.7 QUALITY ASSURANCE

A. Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.

1. Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
2. Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.

B. Instructions for the University's Personnel: Use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved to instruct the University's operation and maintenance personnel.

1.8 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the University's reference during normal working hours.

B. Record Drawings (As-Builts):

1. Markup Procedure: During construction, maintain a set of blue- or black-line white prints of Contract Drawings and Shop Drawings for Project Record Document (As-Built) purposes.
   a. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
      1) Dimensional changes to the Drawings.
      2) Revisions to details shown on the Drawings.
      3) Depths of foundations below the first floor.
      4) Locations and depths of underground utilities.
      5) Revisions to routing of piping and conduits.
      6) Revisions to electrical circuitry.
      7) Actual equipment locations.
      8) Duct size and routing.
      9) Locations of concealed internal utilities.
      10) Changes made by change order.
      11) Changes made following the University's written orders.
      12) Details not on original Contract Drawings.
   b. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
   c. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
   d. Mark important additional information that was either shown schematically or omitted from original Drawings.
   e. Note change-order numbers, and similar identification.

2. Responsibility for Markup: The individual or entity who obtained record data, whether the individual or entity is the Installer, subcontractor, or similar entity, shall prepare the markup on record drawings.
   a. Accurately record information in an understandable drawing technique.
   b. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
   c. At time of Substantial Completion, submit record drawings to the University for the University's records. Organize into sets and bind and label sets for the University's continued use.

C. Record Specifications

1. During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.
   a. Mark the Specifications to indicate the actual installation where the installation varies from that indicated in Specifications and modifications issued. Note related project record drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.
      1) In each Specification Section where products, materials, or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
      2) Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made and to document coordination with record Product Data submittals and maintenance manuals.
      3) Note related record Product Data, where applicable. For each principal product specified, indicate whether record Product Data has been submitted in maintenance manual instead of submitted as record Product Data.
   b. Upon completion of markup, submit record Specifications to the University.

D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.

2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
3. Upon completion of markup, submit three complete sets of record Product Data to the University for the University's records.

E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the University and the University's personnel at the Project Site to determine which Samples are to be transmitted to the University for record purposes. Comply with the University's instructions regarding delivery to the University's Sample storage area. Dispose of other samples in a manner specified for disposing surplus and waste materials.

F. Miscellaneous Record Submittals:

1. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the University for the University's records.
   a. Categories of requirements resulting in miscellaneous records include, but are not limited to, the following:
      1) Field records on excavations and foundations.
      2) Field records on underground construction and similar work.
      3) Survey showing locations and elevations of underground lines.
      4) Invert elevations of drainage piping.
      5) Authorized measurements utilizing unit prices or allowances.
      6) Ambient and substrate condition tests.
      7) Certifications received in lieu of labels on bulk products.
      8) Testing and qualification of tradesmen.
      9) Documented qualification of installation firms.
      10) Load and performance testing.
      11) Inspections and certifications by governing authorities.
      12) Leakage and water-penetration tests.

13) Final inspection and correction procedures.

G. Operation and Maintenance Manuals:

1. Operation Submission Requirements: The University of Maryland, Baltimore (UMB) requires operation and maintenance manuals (O&MM) to be submitted in electronic "pdf" file format, by the CM/GC, before substantial completion to the A/E and the University for review.

2. The CM/GC shall use the UMB Master O&M Template pdf File to create the Project O&M Manual. The file can be accessed through the D&C Web Site @ https://www.umaryland.edu/designandconstruction/. See Current UMB Master O&M Template File.

1.9 INSTRUCTIONS FOR THE UNIVERSITY'S PERSONNEL

A. Prior to final inspection, instruct the University's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed upon times.

1. For equipment that requires seasonal operation, provide similar instruction during other seasons.
2. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the University's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Hazards.
4. Cleaning.
5. Warranties and bonds.
6. Maintenance agreements and similar continuing commitments.

3.2 FINAL CLEANING

A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
    a. Clean the Project Site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and foreign substances.
    b. Sweep paved areas broom clean. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    c. Remove petrochemical spills, stains, and other foreign deposits.
    d. Remove tools, construction equipment, machinery, and surplus material from the site.
    e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, manholes, attics, and similar spaces.

g. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. Shampoo, if required.

h. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

i. Remove labels that are not permanent labels.

j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

o. Clean ducts, blowers, and coils if units were operated without filters during construction.

p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs and defective and noisy starters in fluorescent and mercury vapor fixtures.

q. Leave the Project clean and ready for occupancy.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the University's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the University's property. Dispose of these materials as directed by the University.

END OF SECTION 017000

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:

1. Division 1 “Submittal Procedures” for requirements for submittal formats.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.3 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for dust control and for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of selective demolition activities with starting and ending dates for each activity.

C. Predemolition photographs or video.

1.4 FIELD CONDITIONS

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

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

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

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

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

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

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

G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse

of any portion of structure or adjacent structures during selective building demolition operations.

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

3.2 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

B. Remove temporary barricades and protections where hazards no longer exist.

3.3 SELECTIVE DEMOLITION

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

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches. Ovens used to heat soldering irons shall be set on non-flammable surfaces and shall be under constant observation/fire watch until cool to the touch.
4. Maintain fire watch during any de-soldering operations or any other operation that will utilize a heat source that could cause the structure to catch fire. The fire watch shall continue until all areas have been determined to be safe.
5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
6. Dispose of demolished items and materials promptly.

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

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

3.4 CLEANING

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Coordinate with the Owner for the removal of debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

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

END OF SECTION 024119

SECTION 040322 - HISTORIC BRICK UNIT MASONRY REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Section 049010 Clay Masonry Repointing and Cleaning.

1.2 SUMMARY

A. Section includes historic treatment work consisting of repairing historic clay brick masonry as follows:

1. Repairing unit masonry.

B. Related Requirements:

1. Division 1 “Submittal Procedures: for requirements for submittal formats.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to repairing historic brick masonry, including, but not limited to, the following:

a. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Materials, material application, sequencing, tolerances, and required clearances.
c. Quality-control program.
d. Fire-protection plan.
e. Unit masonry historic treatment program.
f. Control of airborne debris and protection of the surrounding area and public.

1.4 SEQUENCING AND SCHEDULING

A. Work Sequence: Perform masonry historic treatment work in the following sequence, which includes work specified in this and other Sections:

1. Remove plant growth.
2. Inspect masonry for open mortar joints and permanently or temporarily point them before cleaning to prevent intrusion of water and other cleaning materials into the wall.
3. Clean masonry.
4. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
5. Repair masonry, including replacing existing masonry with new masonry materials.
6. Rake out mortar from joints to be repointed.
7. Point mortar and sealant joints.
8. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.

C. As scaffolding is removed, patch anchor holes used to attach scaffolding.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include recommendations for product application and use.
3. Include test data substantiating that products comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and locations of masonry repair work on the structure.

C. Samples for Initial Selection: For the following:

1. Brick: Submit full sized brick samples that match the size, texture. Color and hardness of the existing brick. Used brick, that is cleaned, may be submitted.

D. Samples for Verification: For the following:

1. Accessories: Each type of anchor, accessory, and miscellaneous support.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For historic treatment specialist.

B. Quality-control program.

1.7 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic brick masonry repair specialist. Experience installing standard unit masonry is insufficient experience for masonry historic treatment work.

B. 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 masonry. Include provisions for supervising worker performance and preventing damage.

C. Unit Masonry Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of historic treatment work, including protection of surrounding materials and Project site.

1. Include methods for keeping exposed mortar damp during curing period.
2. If materials and methods other than those indicated are proposed for any phase of historic treatment work, add to the quality-control program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project.

D. Mockups: Prepare mockups of historic treatment to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation.

1. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than two adjacent whole units or approximately 48 inches (1200 mm) in least dimension. Construct sample areas in locations in existing walls where directed by Architect unless otherwise indicated. Demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

   a. Replacement: Four brick units replaced.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on brick masonry as follows:

1. Existing Brick: Test each type of existing brick indicated for replacement, according to testing methods in ASTM C67 for compressive strength, 24-hour cold-water absorption, five-hour boil absorption, saturation coefficient, and initial rate of absorption (suction). Carefully remove five existing units for testing from locations designated by Architect. Take testing samples from these units.
2. Existing Mortar: The results of a previous mortar test, done in 2006, is at the end of this specification. The new mortar shall match the hardness, composition, and color of the tested sample.
3. Temporary Patch: As directed by Architect, provide temporary materials followed by permanent repairs at locations from which existing samples were taken.

1.9 DELIVERY, STORAGE, AND HANDLING

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

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

D. Store lime putty covered with water in sealed containers.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

F. Handle bricks to prevent overstressing, chipping, defacement, and other damage.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit repair work to be performed according to product manufacturers' written instructions and specified requirements.

B. Temperature Limits: Repair brick masonry only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair unless otherwise indicated:

1. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for seven days after repair.

D. Hot-Weather Requirements: Protect masonry repairs when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks, and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Source Limitations: Obtain each type of material for repairing historic masonry (face brick, cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 MASONRY MATERIALS

A. Face Brick: Units, including molded, ground, cut, or sawed shapes as required to complete masonry repair work. Brick shall match the existing brick and the results of the Preconstruction Testing requirements of paragraph 1.8.

2.3 ACCESSORY MATERIALS

A. Setting Buttons and Shims: Resilient plastic, nonstaining to masonry, sized to suit joint thicknesses and bed depths of bricks.

B. Masking Tape: Nonstaining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

C. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Minimal possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:

   a. Remove, alter, or harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in Contract.
   b. Leave residue on surfaces.

2.4 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight to match tested sample. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

C. Colored Mortar: Product mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.

1. Mortar Pigments: Where mortar pigments are required, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance.

D. Do not use admixtures in mortar unless otherwise indicated.

E. Mixes: Mix mortar materials in proportions required to match existing mortar as determined by the previous testing results.

1. Mortar mix shall match material composition, hardness and color of the existing mortar.

PART 3 - EXECUTION

3.1 PROTECTION

A. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
2. Keep wall area wet below rebuilding and repair work to discourage mortar from adhering.
3. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.

B. Remove gutters and downspouts and associated hardware adjacent to immediate work area, and store during masonry repair work. Reinstall when repairs are complete.

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

3.2 MASONRY REPAIR, GENERAL

A. Have repair work performed only by qualified historic treatment specialist.

B. Repair Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from **20 (6)** feet (m) away by Architect.

3.3 BRICK REMOVAL AND REPLACEMENT

A. At locations determined by the Contractor, and agreed upon by the Architect and Owner, remove bricks that are damaged, spalled, or deteriorated. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Support and protect remaining masonry that surrounds removal area.

C. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

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

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

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
3. Store brick for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.

F. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for brick replacement.

G. Replace removed damaged brick with salvaged brick in good condition, where possible, matching existing brick. Do not use broken units unless they can be cut to usable size.

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

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

I. Lay replacement brick with rebuilding (setting) mortar and with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.). Use wetting methods that ensure that units are nearly saturated, but surface is dry when laid.

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

J. Curing: Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

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

3.4 FINAL CLEANING

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

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

B. Clean adjacent nonmasonry surfaces. Use detergent and soft brushes or cloths.

1. Do not use water pressure greater than 30 PSI (garden hose.)

C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Remove masking materials, leaving no residues that could trap dirt.

3.5 MASONRY-WASTE DISPOSAL

A. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

PENNIMAN & BROWNE, INC.

CHEMISTS / ENGINEERS / INSPECTORS
INDUSTRIAL HYGIENE SERVICES
FOUNDED 1896

February 6, 2006

Structural Group
6955 San Tomas Road
Elkridge, Maryland 21075
Attention: Paul Farrell

Re: Mortar Analysis Davidge Hall Project
Lab No.: 60000476
Received: 1/27/06

PORTLAND - CEMENT CONTENT AND HARDENED MASONRY MORTAR ANALYSIS ASTM C1084, ASTM C1324

	By Weight, %	By Volume	Assumed Unit Weight, pcf
Cement	17.1	1	94
Lime Content	9.9	1.3	40
Sand	71.0	4.8	80
Color of Sand - White			

Gradation

Sieve	% Finer	ASTM C144 Specification	
		Natural Sand	Manufactured Sand
#8	99.0	95-100	95-100
#16	98.1	70-100	70-100
#30	81.2	40-75	40-75
#50	15.5	10-35	20-40
#100	1.8	2-15	10-25
#200	0.2	0-5	0-10

The Closest Proportions by Volume in accordance with ASTM C270

Masonry Cement Type O – 1 Part	Cement - 1Part
Sand - 2.25 Part	Lime - 1.5 Parts
	Sand - 5.6 Parts

Respectfully,

PENNIMAN & BROWNE, INC.

Ayzik Vaynshteyn, P.E.
Laboratory Director

6252 Falls Rd. / P.O. Box 65309 / Baltimore, Maryland 21209-0509
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END OF SECTION 040322

SECTION 049010 - CLAY MASONRY REPOINTING AND 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 this Section.

B. A sample of the existing mortar was tested in 2006. The location the sample was taken from the building is unknown at this time. The testing results are found at the end of this specification section.

1.2 SUMMARY

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

1. Repointing joints above the elevation of the stucco band and wood entablature identified on the drawings.
2. Preliminary cleaning, including removing plant growth.
3. Cleaning exposed unit masonry surfaces.

B. Related Sections:

1. Section 040322 "Historic Brick Unit Masonry Repair" for the replacement of damaged clay masonry construction.

1.3 DEFINITIONS

A. Very Low-Pressure Spray: Under 30 psi.

B. Low-Pressure Spray: 50 psi.

C. Saturation Coefficient: Ratio of the weight of water absorbed during immersion in cold water to weight absorbed during immersion in boiling water; used as an indication of resistance of masonry units to freezing and thawing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Chemical-cleaner manufacturer.

B. Cleaning Program.

1.6 QUALITY ASSURANCE

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

1. At Contractor's option, work may be divided between two specialist firms: one for cleaning work and one for repair work.
2. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm.

B. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.

C. Source Limitations: Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

D. 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 masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.

E. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

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

1. Cleaning: Clean an area approximately 25 sq. ft. for each type of masonry and surface condition.

a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect.
b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to masonry restoration and cleaning including, but not limited to, the following:

a. Construction schedule. Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Materials, material application, sequencing, tolerances, and required clearances.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. Repair masonry units and repoint mortar joints only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:

1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F.
2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after repair and pointing.

D. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

F. Clean masonry surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.9 COORDINATION

A. Coordinate masonry restoration and cleaning with public circulation patterns at Project site.

1.10 SEQUENCING AND SCHEDULING

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

B. Perform masonry restoration work in the following sequence:

1. Remove plant growth.
2. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
3. Clean masonry surfaces.
4. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.

5. Repair masonry, including replacing existing masonry with new masonry materials.
6. Rake out mortar from joints to be repointed.
7. Point mortar and sealant joints.
8. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
9. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
10. Clean masonry surfaces.

C. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in masonry units to comply with "Masonry Unit Patching" Article. Patch holes in mortar joints to comply with "Repointing Masonry" Article.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Face Brick: To match the existing brick.

2.2 MORTAR MATERIALS: To match the analysis at the end of this specification section..

2.3 CLEANING MATERIALS

A. Water: Potable.

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

C. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.

1. Products: Subject to compliance with requirements provide one of the following:
   a. PROSOCO; Enviro Klean 2010 All Surface Cleaner. (Basis of Design Product)

2.4 MORTAR MIXES: To match mortar analysis at the end of this specification section. Mortar shall match hardness, material composition and color of existing mortar when cleaned.

PART 3 - EXECUTION

3.1 PROTECTION

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

1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.

2. Provide temporary enclosures as required to prevent dust and spray from spreading to the public areas.

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

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
2. Keep wall wet below area being cleaned to prevent streaking from runoff.
3. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
5. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

C. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed masonry and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

3.2 UNUSED ANCHOR REMOVAL

A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.

1. Remove items carefully to avoid spalling or cracking masonry.
2. Where directed, if an item cannot be removed without damaging surrounding masonry, do the following:

    a. Cut or grind off item approximately 3/4 inch beneath surface and core drill a recess of same depth in surrounding masonry as close around item as practical.
    b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.

3. Patch the hole where each item was removed unless directed to remove and replace the masonry unit.

3.3 BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, and where the bricks can be viewed as damaged, remove bricks that are damaged, or are to be reused. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

1. When removing single bricks, remove material from center of brick and work toward outside edges.

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

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

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

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
3. Store brick for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.

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

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

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

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

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

3.4 CLEANING MASONRY, GENERAL

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

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

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

    a. Equip units with pressure gages.

3. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
4. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

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

D. Water Application Methods:

1. Water-Soak Application: Soak masonry surfaces by applying water continuously and uniformly to limited area for time indicated. Apply water at low pressures and low volumes in multiple fine sprays using perforated hoses or multiple spray nozzles. Erect a protective enclosure constructed of polyethylene sheeting to cover area being sprayed.
2. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

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

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

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

G. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.5 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Remove loose soil and debris from open masonry joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.

3.6 CLEANING BRICKWORK

A. Nonacidic Liquid Chemical Cleaning:

1. Wet masonry with cold water applied by very low-pressure spray.
2. Apply cleaner to masonry in two applications bucket and brush method. Let cleaner remain on surface for period indicated below:

    a. As recommended by chemical-cleaner manufacturer one to ten minutes based on testing of mockup areas.

3. Rinse with cold water applied by very low-pressure spray to remove chemicals and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use steam cleaning.

3.7 REPOINTING MASONRY

A. Rake out and repoint joints to the following extent:

1. All joints in areas above the stucco band and wood entablature indicated on the drawings.
2. Joints where mortar is missing or where they contain holes.
3. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.
4. Cracked joints where cracks are 1/16 inch or more in width and of any depth.
5. Joints where they sound hollow when tapped by metal object.
6. Joints where they are worn back 1/4 inch or more from surface.
7. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
8. Joints where they have been filled with substances other than mortar.
9. Joints indicated as sealant-filled joints.

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

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

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

a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval based on approved quality-control program.
b. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.

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

E. Pointing with Mortar:

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

    a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
    b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

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

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

3.8 FINAL CLEANING

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

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

B. Wash adjacent woodwork and other nonmasonry surfaces. Use detergent and soft brushes or cloths.

C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

PENNIMAN & BROWNE, INC.

CHEMISTS / ENGINEERS / INSPECTORS
INDUSTRIAL HYGIENE SERVICES
FOUNDED 1896

February 6, 2006

Structural Group
6955 San Tomas Road
Elkridge, Maryland 21075
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Masonry Cement Type O – 1 Part	Cement - 1Part
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	Sand - 5.6 Parts

Respectfully,

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Ayzik Vaynshteyn, P.E.
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END OF SECTION 049010

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SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Plywood Roof sheathing.
2. Wood furring, grounds, nailers, blocking, and trim.
3. Curbs framed with engineered wood products.

1.3 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise specified.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the National Hardwood Lumber Association (NHLA).

B. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

C. Warranty of chemical treatment manufacturer for each type of treatment.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience

and capability to satisfactorily conduct the testing indicated without delaying the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.

1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Lumber Standards: Comply with the NHLA American Hardwood Lumber Grades Manual for species and grades.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by NHLA 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, unless otherwise indicated.

B. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

1. Provide dressed lumber unless otherwise indicated.
   a. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
   b. Provide any hardwood meeting the NHLA Grade Number 23A Common.

2.2 ENGINEERED WOOD PRODUCTS

A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according

to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.

C. Extreme Fiber Stress in Bending, Edgewise: 2250 psi for 12-inch nominal- depth members.

D. Modulus of Elasticity, Edgewise: 2,000,000 psi

2.3 ROOF SHEATHING

A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exterior, Structural I, C-C Plugged panels.

B. Span Rating: Not less than 16 o.c.

C. Nominal Thickness: As shown on the drawings and to match the existing roof sheathing.
1. Coordinate with Allowances and Unit Prices Specification Sections.

D. Edge Detail: Square.

2.4 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping painted trim, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown. Moisture Content: 12 percent maximum .

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.Power-Driven Fasteners: CABO NER-272.

C. Wood Screws: ASME B18.6.1.

D. Lag Bolts: ASME B18.2.1.

E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

a. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1) Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

D. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

E. Use hot-dip galvanized or stainless-steel nails.

F. Drive fasteners so that the head is slightly below the surface of the wood.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts below surfaces, unless otherwise indicated.

END OF SECTION 061000

SECTION 070150.19 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Division 1 Section “Submittal Procedures” for requirements and submittal formats.

C. Division 2 Section “Selective Demolition” for associated demolition requirements.

1.2 SUMMARY

A. Section Includes:

1. Full tear-off of roof system at areas indicated on Drawings.
2. Partial tear-off of roof areas indicated on Drawings.
3. Re-cover preparation of roof areas indicated on Drawings.
4. Removal of flashings and counterflashings.
5. Temporary roofing.

B. Related Requirements:

1. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.

2. Division 1 Section “Submittal Procedures” for requirements for submittal formats.

3. Division 2 Section “Selective Demolition” for demolition requirements.

1.3 DEFINITIONS

A. Full Roof Tear-off: Removal of existing roofing system down to existing roof deck concrete.

B. Partial Roof Tear-off: Removal of selected components and accessories from existing roofing system.

C. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing tear-off, including, but not limited to, the following:

a. Reroofing preparation, including roofing system manufacturer's written instructions.
b. Temporary protection requirements for existing roofing system components that are to remain.
c. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain plugging and plug removal.
d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
e. Existing roof deck conditions requiring Architect notification.
f. Existing roof deck removal procedures and Owner notifications.
g. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
h. Structural loading limitations of roof deck during reroofing.
i. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
j. HVAC shutdown and sealing of air intakes.
k. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
l. Asbestos removal and discovery of asbestos-containing materials.
m. Governing regulations and requirements for insurance and certificates if applicable.
n. Existing conditions that may require Architect notification before proceeding.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Temporary Roofing Submittal: Product data and description of temporary roofing system.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1. Include certificate that Installer is approved by warrantor of existing roofing system.

B. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations.

1. Submit before Work begins.

C. Landfill Records: Indicate receipt and acceptance of demolished roofing materials, by a landfill facility licensed to accept them.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Approved by warrantor of existing roofing system to work on existing roofing.

B. Regulatory Requirements:

1. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.8 FIELD CONDITIONS

A. Existing Roofing System:

1. The Dome: Cypress Shingles over an EPDM membrane underlayment over a wood deck.

2. The Gable: Terne coated stainless (TCS) pans over kraft paper slip sheet underlayment over a wood deck.

3. The Intermediate Roofs: Three areas of soldered terne coated stainless pans over kraft slip sheet underlayment over a wood deck.

4. Quadrants: Two areas of soldered terne coated stainless pans over kraft slip sheet underlayment over a wood deck.

B. Owner will occupy portions of building immediately below reroofing area.

1. Conduct reroofing so Owner's operations are not disrupted.
2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
4. Before working over any structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area.

a. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.

C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

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

F. Limit construction loads on existing roof areas to remain, and existing roof areas scheduled to be reroofed.

G. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

1. Remove only as much roofing in one day as can be made watertight in the same day.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

A. Plywood: DOC PS 1, Grade CD, Exposure 1.

2.2 TEMPORARY ROOFING MATERIALS

A. Design and selection of materials for temporary roofing are Contractor's responsibilities.

2.3 INFILL AND REPLACEMENT MATERIALS

A. Use infill materials matching existing roofing sheathing materials unless otherwise indicated.

B. Wood blocking, curbs, and nailers are specified in Division 6 Section "Rough Carpentry."

C. Roof Sheathing:

1. Plywood roof sheathing, to match the thickness of the existing nominal 3/8-inch thickness complying with Division 6 Section "Rough Carpentry."

D. Fasteners: Stainless steel, and acceptable to new roofing system installation to maintain the warranty.

2.4 AUXILIARY REROOFING MATERIALS

A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Protect existing roofing system that is not to be reroofed.

B. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.

C. Shut off dry pipe fire suppression piping at north side before beginning the Work in that area.

D. Test existing downspouts to verify that they are not blocked or restricted.

1. Immediately notify Architect of any blockages or restrictions.

E. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.

1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

F. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

G. Maintain roof drainage in functioning condition to ensure roof drains at end of each workday.

1. Prevent debris from entering or blocking gutters and downspouts.

2. If downspouts are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding.

a. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF TEAR-OFF

A. Confirm with the Owner each day the extent of roof tear-off proposed for that day and obtain authorization to proceed.

B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.

C. Remove accessories from roofing.

D. Full Roof Tear-off: Where indicated on Drawings, remove existing roofing and other roofing system components down to the existing roof deck to the extent indicated on the drawings.

1. Remove base flashings and counter flashings.
2. Remove flashings at walls, and curbs.
3. Remove downspouts indicated on Drawings to be removed.
4. Remove wood blocking, curbs, and nailers as required.

3.3 DECK PREPARATION

A. Inspect roof sheathing after tear-off of roofing system.

B. If roof sheathing is unsuitable for receiving new roofing immediately notify Architect.

1. Do not proceed with installation until directed by Architect.

C. Replace plywood roof sheathing as included in the Allowances specification of the contract documents.

3.4 INFILL MATERIALS INSTALLATION

A. Immediately after roof tear-off, and inspection and repair, if needed, of deck, fill in tear-off areas to match existing roofing system construction.

B. Install new roofing patch over roof infill area.

1. If new roofing is installed the same day tear-off is made, roofing patch is not required.

3.5 TEMPORARY ROOFING

A. Install approved temporary roofing over area to be reroofed.
1. Temporary roofing shall include the high temperature ice and water shield underlayment.
2. The exposure to sunlight shall not exceed that limited by the manufacturer. If exposure does exceed the maximum duration the existing underlayment shall be removed and replaced with new underlayment.

3.6 DISPOSAL

A. Collect demolished materials and place in containers.

1. Promptly dispose of demolished materials.
2. Do not allow demolished materials to accumulate on-site.
3. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 070150.19

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SECTION 074113.16 - STANDING-SEAM AND FLAT SEAMED COPPER ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Standing-seam metal roof panels.

B. Division 1 Section “Submittal Procedures” for requirements and submittal formats.

1.2 RELATED DOCUMENTS

A. Division 1 Section “Submittal Procedures” for requirements and submittal formats.

B. The handbook A4050-Copper in Architecture, A comprehensive compilation of designs, details and specifications, published by the Copper Development Association, Inc. is made part of this specification and the basis of design for the detailing of the roof.
   1. Herein referred to as Handbook A4050.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

   1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
   4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
   5. Review structural loading limitations of deck during and after roofing.
   6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
   7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
   8. Review temporary protection requirements for metal panel systems during and after installation.
   9. Review procedures for repair of metal panels damaged after installation.
   10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For standing-seam metal roof panels. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 6 inches per 12 inches .
3. Provide expansion calculations to verify expansion gaps shown on the shop drawings and to verify that excessive panel movement will not occur.
   a. Indicate expansion allowances in the shop drawings.
   b. Indicate direction of anticipated expansion for roof panels and gutters.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.
   a. Provide samples with bends used for flat seamed roofing panels.
   b. Provide samples with bends for the flat standing seam roofing
   c. Provide samples with bends for curved and tapered standing seam roofing.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranty and water tightness warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and experienced with forming and installing a standing seam copper roof and flat seamed copper roof on a historical building.

1.8 MOCKUPS

A. Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build two mockup of each roof type slope, flat/curviture and eave as shown on Drawings; approximately 48 inches square, including attachments underlayment, and accessories. Mockup shall be constructed on the ground with framework replicating the roof slopes and roof curvature.
   a. One of each of the mockups may be disassemble by the BEC-A.

2. Coordinate construction of the mock-up with the owner and BEC-A so that they may observe the construction of the mock-up.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.11 COORDINATION

A. Coordinate sizes and locations of roof curbs, and roof penetrations with actual existing conditions.

B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Special Warranty: Installer's standard form in which they agree to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Weathertightness Warranty: Installer's standard form in which Installer agrees to repair or replace standing-seam metal roof panel and flat seamed assemblies that fail to remain weathertight, including leaks, within specified warranty period.

1. Warranty Period: 5 years from date of Substantial Completion.

1.13 INSPECTION SERVICES

A. The Owner will provide an independent inspection agency to observe the fabrication and installation of the roofing system. The Contractor shall provide access to the inspection agency as required.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: The Installer shall provide a design that meets the requirements of the construction documents and Handbook A4050.

B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:

1. Deflection Limits: For wind loads, no greater than 1/180 of the span.

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

1. Uplift Rating: UL 90.

E. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-120.
2. Hail Resistance: MH.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 STANDING-SEAM METAL ROOF PANELS

A. Provide field or shop formed metal roof panels designed to be installed by lapping and folding raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to the roof sheathing using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels. Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.

C. The details and materials shall conform to Chapter 8.1 Special Details, Chapter 8.2 and Chapter 8.8 of Handbook A4050.
1. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 temper.
   a. Thickness: 20 oz./sq. ft. (0.68 mm thick).
   b. Exposed Finish: Mill.
2. Clips: One-piece clip to restrain movement at the top of panels as required.
3. Two-piece floating to accommodate thermal movement where required.
4. Panel Coverage: As indicated on drawings.
5. Panel Height: 7/8 inches.
6. Soldering: Seams shall be folded flat and soldered when the roof slope is less than 3 in 12, where indicated on the drawings, and when recommended by A4050.

2.3 FLAT SEAMED COPPER ROOF PANELS

A. Provide field or shop formed metal roof panels designed to be installed by interlocking, flattening, and soldering one side edge and the bottom of adjacent panels with joint type

indicated and mechanically attaching panels to the roof sheathing using concealed clips on one side and top lap. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

B. The details and materials shall conform to Chapter 8.5 of Handbook A4050.
   1. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 temper.
      a. Thickness: 20 oz./sq. ft. (0.68 mm thick).
      b. Exposed Finish: Mill.
   2. Clips: One-piece copper cleat.
   3. Panel Coverage: 18-inch by 24-inch before seams
   4. Soldering: Seams shall be folded flat and soldered when the roof slope is less than 3 in 12, where shown on the drawing, and when recommended by Handbook A4050.

2.4 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.

   1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D1970.
   2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D1970.

B. Felt Underlayment: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts.

C. Slip Sheet: Rosen paper slip sheet, of type required for application.

2.5 MISCELLANEOUS MATERIALS

A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

C. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot- (3-m-) long sections, complete with formed elbows and offsets, of size and metal thickness according to Handbook A4040 and to match the existing profile and mounting.

D. Panel Fasteners: Copper nails designed to withstand design loads.

E. Panel Sealants: Provide sealant type recommended by Handbook A4050 that are compatible with panel materials, are nonstaining, and do not damage panel finish.

2.6 FABRICATION

A. Fabricate metal panels and accessories, by Installer's standard procedures and processes, as necessary to fulfill indicated performance requirements included in Handbook A4050. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using portable roll-forming equipment. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Fabricate metal panel joints that provide a weathertight seal, with sealant as prescribed by Handbook A4050 and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with Installer's recommendations and recommendations in Handbook A4050 that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with Handbook A4050 standards.
4. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored.

    a. Size: As recommended by Handbook A4050, but not less than thickness of metal being secured.

2.7 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Copper Panels and Accessories:

1. Copper panels and accessories are to meet the standards and specifications of Handbook A4050.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel installer and Handbook A4050.

      a. Verify that water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
   1. Skylights, chimneys and other existing items shall be field verified and dimensioned on the shop drawings to avoid interference with seams.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

A. High Temperature Self-Adhering Self-sealing Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Extend underlayment into gutter trough to edge termination. Roll laps with roller. Cover underlayment within 14 days.

   1. Apply over the entire roof surface, including concealed gutter and projections.

B. Flashings: Install flashings to cover underlayment to comply with requirements of Handbook A4050.

3.3 INSTALLATION OF COPPER ROOF PANELS

A. Install metal panels according to Handbook A4050 and the drawings in orientation, sizes, and locations indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement as required.
   1. Do not install panels until the self-adhering self-sealing underlayment is in place.
   2. If roofing installation is phased, limit panel installation to an area of underlayment that exposes enough underlayment to meet the overlap requirements.
   3. Coordinate seam locations to avoid interference with flashing terminations.

B. Fasteners:

1. Copper Panels: Use copper, stainless steel, or hardware-bronze fasteners.

C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using approved fasteners according to Handbook A4050's instructions.
   1. Provide fixed anchor clips at the top of panels as recommended by Handbook A4050.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended by Handbook A4050.

E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in Handbook A4050.
   1. Watertight Installation:
      a. Apply a continuous ribbon of sealant to seal joints of metal panels, using sealant or tape where recommend by Handbook A4050, Section 8.1 Special Conditions, as needed to make panels watertight.
      b. Fully solder seams where the roof slope is les than 3 in 12.

F. Flat Panel Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at one side and top, spacing and with fasteners recommended in Handbook A4050.
   1. Watertight Installation:

      a. Interlock one side and the bottom over two adjacent panels. Flatten interlocked seams and fully solder per Handbook A4050 as needed to make panels watertight.

G. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

   1. Install components required for a complete metal panel system including trim, corners, seam covers, flashings, sealants, gaskets, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by Handbook A4050.

H. Flashing and Trim: Comply with performance requirements, and Handbook A4050. Provide concealed fasteners, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between.
   1. Downspout profile and mounting shall match existing.

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

A. The Owner will provide an independent inspection agency to review the facbrication and installation of the roofing system.

B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by Handbook A4050. Maintain in a clean condition during construction.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Division 1 Section “Submittal Procedures” for requirements and submittal formats.

C. Division 7 Section “ Standing Seam Metal Roofing” for sealants provided as part of the roofing systems.

1.2 SUMMARY

A. This Section includes joint sealants for the applications indicated.

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
   a. Joints between different materials.
   b. Other joints as indicated.

B. Related Requirements:

1. Division 1 “Submittal Procedures” for requirements for submittal formats.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

F. Qualification Data: For Installer.

G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.

H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

I. Field Test Report Log: For each elastomeric sealant application.

J. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

K. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Multicomponent Nonsag Urethane Sealant:

1. Products:

   a. Pecora Corporation; Dynatrol II.
   b. Tremco; Dymeric 511.
   c. Tremco; Vulkem.

2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 50.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, and, as applicable to joint substrates indicated, O.

2.4 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C closed-cell material with a surface skin and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
   a. Masonry.
   b. Unglazed surfaces of ceramic tile.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
   a. Metal.
   b. Glass.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.

   a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 080152 - WOOD WINDOW REPAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes wood window repairs as follows:
1. Repairing wood skylight window sashes.
2. Repairing circle top wood windows and frames
3. Reglazing windows.
4. Repainting the sashes.

B. Related Requirements:

1. Division 1 “Submittal Procedures” for requirements for submittal formats.

1.3 DEFINITIONS

A. Glazing: Includes glass, glazing points, glazing tapes, glazing sealants, and glazing compounds.

B. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

C. Wood Window Component Terminology: Wood window components for repair work include the following classifications:

1. Frame Components: Head, jambs, and sill.
2. Sash Components: Stiles and rails, parting bead, stop, and muntins.

1.4 SEQUENCING AND SCHEDULING

A. Perform window repairs in the following sequence, which includes work specified in this and other Sections:

1. Label each window frame with permanent opening-identification number in inconspicuous location.
2. Tag existing window sash with opening-identification numbers and remove for on-site or off-site repair. Indicate on tags the locations on window of each component, such as "top sash."

3. Remove window, dismantle hardware, and tag hardware with opening-identification numbers.
4. Install temporary protection and security at window openings.
5. In the shop, label each sash, storm window, and shutter unit with permanent opening-identification number in inconspicuous location and remove site-applied tags.
6. Sort units by condition, separating those that need extensive repair.
7. Clean surfaces.
8. General Wood-Repair Sequence:

    a. Remove paint to bare wood.
    b. Rack frames slightly to inject adhesive into mortise and tenon joints; square frames to proper fit before adhesive sets.
    c. Repair wood by consolidation, member replacement, partial member replacement, and patching.
    d. Sand, prime, fill, sand again, and prime surfaces again for refinishing.

9. Repair, refinish, and replace hardware if required. Reinstall operating hardware.
10. Clean and install glazing for windows. Skylight sashes shall remain unglazed.
11. Remove temporary protection and security at window openings.
12. Reinstall units.
13. Apply finish coats.
14. Install remaining hardware and weather stripping.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for product application and use.
2. Include test data substantiating that products comply with requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For wood-window-repair specialist.

B. Preconstruction Test Reports: For wood window repairs.

1.7 QUALITY ASSURANCE

A. Wood-Window-Repair Specialist Qualifications: A qualified wood window specialist, experienced in repairing, refinishing, and replacing wood windows in whole and in part. Experience only in fabricating and installing new wood windows is insufficient experience for repairing wood windows.

1.8 DELIVERY, STORAGE, AND HANDLING

1. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products are not deformed, broken, or otherwise damaged.
2. Store products inside a well-ventilated area and where environmental conditions comply with manufacturer's requirements; protect from weather, moisture, soiling, abrasion, extreme temperatures, and humidity

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with wood window repairs only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

PART 2 - PRODUCTS

2.1 WOOD WINDOW REPAIRS, GENERAL

A. Quality Standard: Comply with applicable requirements in Section 6, "Interior & Exterior Millwork," in AWI/AWMAC/WI's "Architectural Woodwork Standards" for construction, finishes, grades of wood windows, and other requirements unless otherwise indicated.

1. Exception: Industry practices cited in Section 6, Article 1.5, Industry Practices, of the Architectural Woodwork Standards do not apply to the work of this Section.

2.2 WOOD-REPLACEMENT MATERIALS

A. Wood, General: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inches (51 mm) wide.

1. Species: Premium grade South American mahogany from controlled growth areas.

2.3 WOOD-REPAIR MATERIALS

A. Source Limitations: Obtain wood consolidant and wood-patching compound from single source from single manufacturer.

B. Wood Consolidant: Ready-to-use product designed to penetrate, consolidate, and strengthen soft fibers of wood materials that have deteriorated due to weathering and decay and designed specifically to enhance the bond of wood-patching compound to existing wood.

C. Wood-Patching Compound: Two-part epoxy-resin wood-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

2.4 GLAZING MATERIALS

A. Glass: Remove, clean and reinstall existing panes.

B. Glazing Systems:

1. Traditional Glazing Products: Glazing points and oil-based glazing putty.
2. Primers and Cleaners for Glazing: As recommended in writing by glazing material manufacturer.

2.5 MISCELLANEOUS MATERIALS

A. Cleaning Materials:

1. Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 1/2 cup (125 mL) of laundry detergent that contains no ammonia, 5 quarts (5 L) of 5 percent sodium hypochlorite bleach, and 15 quarts (15 L) of warm water for each 5 gal. (20 L) of solution required.
2. Mildewcide: Commercial, proprietary mildewcide or a solution prepared by mixing 1/3 cup (80 mL) of household detergent that contains no ammonia, 1 quart (1 L) of 5 percent sodium hypochlorite bleach, and 3 quarts (3 L) of warm water.

B. Adhesives: Wood adhesives for exterior exposure, with minimum 15- to 45-minute cure at 70 deg F (21 deg C), in gunnable and liquid formulations as recommended in writing by adhesive manufacturer for each type of repair.

C. Anchors, Clips, and Accessories: Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel complying with requirements in ASTM B633 for SC 3 (Severe) service condition.

2.6 WOOD WINDOW FINISHES

A. Shop-Finished Units: Finish system consisting of primer and two finish coats on exposed exterior and interior wood surfaces.

1. Prime Coat: Primer, alkyd for exterior wood.
   a. Benjamin Moore Primer – Fresh Start 094, or equal.
2. Intermediate and Top Coats: Exterior, 100% acrylic enamel.
   a. Benjamin Moore Aura – semigloss 623, or equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect adjacent materials from damage by performing wood window repairs.

B. Clean wood windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

C. Condition replacement wood members and replacement units to prevailing conditions at installation areas before installing.

3.2 WOOD WINDOW REPAIRS, GENERAL

A. Have wood window repairs performed only by qualified wood-window-repair specialist.

B. Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from the window interior at 10 feet (3 m) away and from the window exterior at 20 feet (6 m) away.

C. Execution of the Work: In repairing wood windows, disturb them as minimally as possible and as follows:

1. Stabilize and repair wood windows to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Remove coatings and apply borate preservative treatment before repair.
3. Repair items in place where possible.
4. Install temporary protective measures to protect wood window from work that is indicated to be completed later.

D. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use gentle mechanical methods, such as scraping and natural-fiber bristle brushing, that will not abrade wood substrate, reducing clarity of detail.

E. Repair and Refinish Existing Hardware: Dismantle window hardware; strip paint, repair, and refinish it to match finish samples; and lubricate moving parts just enough to function smoothly.

F. Repair Wood Windows: Match existing materials and features.

1. Repair wood windows by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.

G. Protection of Openings: Where sash or windows are removed for repair, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.

H. Identify removed windows, frames, sash, and members with numbering system corresponding to window locations to ensure reinstallation in same location. Key windows, sash, and members to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.

3.3 WOOD WINDOW PATCH-TYPE REPAIR

A. General: Patch wood members that exhibit depressions, holes, or similar voids and that have limited amounts of rotted or decayed wood.

1. If required, remove skylight sashes from curbs before performing patch-type repairs.
2. R If required remove window sashes from masonry opening before performing patch-type repairs at meeting or sliding surfaces unless otherwise indicated. Reglaze units before reinstallation.
3. Verify that surfaces are sufficiently clean and free of paint residue before patching.
4. Remove rotted or decayed wood down to sound wood.

B. Apply wood-patching compound to fill depressions, nicks, cracks, and other voids created by removed or missing wood.

1. Prime patch area with application of wood consolidant or manufacturer's recommended primer.
2. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
3. Apply patching compound in layers as recommended in writing by manufacturer until the void is completely filled.
4. Sand patch surface smooth and flush with adjacent wood, without voids in patch material, and matching contour of wood member.
5. Clean spilled compound from adjacent materials immediately.

3.4 GLAZING

A. Comply with combined written instructions of manufacturers of glazing materials, unless more stringent requirements are indicated.

B. Remove glass, clean and reinstall.

C. Apply primers to joint surfaces for adhesion of glazing material.

D. Set glass in glazing material. Trim excess and smooth exterior material.

3.5 FIELD QUALITY CONTROL

A. Manufacturers Field Service: Engage wood-repair-material manufacturers' factory-authorized service representatives for consultation and Project-site inspection and to provide on-site assistance when requested by Architect.

3.6 ADJUSTING

A. Adjust existing operating sash, hardware, weather stripping, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.7 CLEANING AND PROTECTION

A. Protect window surfaces from contact with contaminating substances resulting from construction operations. Monitor window surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact window surfaces, remove contaminants immediately.

B. Clean exposed surfaces immediately after repairing wood windows. Avoid damage to coatings and finishes. Remove excess sealants, glazing and patching materials, dirt, and other substances.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction.

END OF SECTION 080152

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SECTION 086100 - ROOF WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fixed (nonoperable) roof windows to be mounted over existing skylights mounted on existing curbs.

B. Related Requirements:

1. Division 1 Section "Submittals" for requirements and submittal formats.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for roof windows.

B. Shop Drawings: For roof windows.

1. Include plans, elevations, sections, and installation details.

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

D. Samples for Initial Selection: For units with factory-applied finishes.

1. Include Samples of hardware and accessories involving color selection.

E. Samples for Verification: For each type of roof window and each type of exposed finish, in manufacturer's standard sizes.

1. Include full-size Samples of hardware and accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each roof windows, for comprehensive tests performed by a qualified testing agency.

B. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roof windows and accessories to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect roof windows during transit, storage, and handling to prevent damage, soiling, and deterioration. Store off ground and covered in a clean, dry, well-ventilated, protected space. Comply with manufacturer's written instructions.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace roof windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures, including excessive deflection.
c. Water leakage.
d. Faulty operation of sashes and hardware.
e. Deterioration of materials and finishes beyond normal weathering.
f. Deterioration of insulating-glass units, including failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating-glass units contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
g. Deterioration of laminated-glass lites, including defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination that materially obstructs vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

2. Warranty Period:

a. Roof Window: Ten years from date of Substantial Completion.
b. Insulating-Glass Units: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified, with label attached to each roof window.

B. Basis of Design: Velux FCM Roof Window or approved equal.
1. Fixed curb mounted unit skylight with a roll-formed aluminum frame counter-flashing joined by corner keys, an interior condensation drainage gasket, an insulated glass unit, structural sealant, mounting fasteners, flashing and accessories, as required to meet installation and performance requirements indicated.

C. Insulating-Glass Units: ASTM E2190.

1. Exterior Lite: Fully tempered glass with Low-E coating.
2. Interior Lite: Laminated glass; heat-strengthened glass with 0.090-inch (2.29-mm-) polyvinyl butyral interlayer.

D. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

E. Exposed Finishes:

1. Exposed to the Interior: Manufacturer's standard white finish.
2. Exposed to the Exterior: White PVF on aluminum cladding.

F. Fabrication:

1. Provide full-perimeter weather stripping for each sash.
2. Provide condensation gutter or other means to hold condensed moisture or drain it to exterior.
3. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

G. Fall Protection Standard Compliance: 29 CFR 1910.23: Passed for all laminated fixed curb mount unit skylights.

H. Windborne-Debris Resistance:

1. Wind Zone 3 or Less: Provide unit skylights capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed representative of those specified, according to ASTM E 1886 and ASTM E 1996. Missile Level C, Wind Zone 3 requirements, and +50/-50 psf cycle pressure minimum.

I. Fire Ratings for Roof Assemblies with Fire Classifications: Unit skylight tested in accordance with ASTM E 108 and listed as passing Burning Brand test with target classification of Class B.

2.2 ACCESSORIES

A. Mull Kit: Manufacturer's standard for installing two units side by side or inline; finished to match roof window units.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements, rough opening dimensions, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions for installing roof windows and accessories.

B. Install roof windows square, true, and without distortion, warp, or rack of frames and sash. Securely anchor windows to structural support without impeding thermal movement.

C. Separate aluminum, copper, and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to recommendations in ASTM E2112.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Clean frame surfaces immediately after installing roof windows. Comply with manufacturer's written instructions for final cleaning and maintenance. Avoid damaging protective coatings and finishes.

B. Inspect drainage holes for blockage. Clean and free holes of any obstructions to allow drainage.

C. Clean glass immediately after installing roof windows. Comply with manufacturer's written instructions for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect roof window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances contact roof window surfaces, remove contaminants immediately according to manufacturer's written instructions.

F. Refinish or replace roof windows that have damaged finishes.

G. Replace damaged components.

END OF SECTION 086100

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SECTION 092400 – PORTLAND CEMENT STUCCO ON MASONRY WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior vertical plasterwork (stucco) on existing brick walls.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

C. Samples: For each type of factory-prepared finish coat to match existing finish and color.

D. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color and texture specified.

E. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, 12 by 12 inches (305 by 305 mm), and prepared on rigid backing.

1.5 QUALITY ASSURANCE

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

1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.

a. Size: Sixteen square feet (4 feet by 4 feet) in surface area.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.7 FIELD CONDITIONS

A. Comply with ASTM C926 requirements.

B. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 deg F (4.4 deg C).
3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E119 by a qualified testing agency.

2.2 ACCESSORIES

A. General: Comply with ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:
1. External- (Outside-) Corner Reinforcement: Fabricated from metal lath with ASTM A653/A653M, G60 (Z180), hot-dip galvanized-zinc coating.
2. Casing Beads: Fabricated from [**zinc**] [**or**] [**zinc-coated (galvanized) steel**]; square-edged style; with expanded flanges.

2.3 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Bonding Compound: ASTM C932.

C. Fasteners for Attaching Metal Lath to Substrates: ASTM C1063.

D. Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter unless otherwise indicated.

2.4 PLASTER MATERIALS

A. Portland Cement: ASTM C150/C150M, **Type II**.

1. Color for Finish Coats: As required to match existing.

B. Colorants for Job-Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color to match existing.

C. Lime: ASTM C206, Type S; or ASTM C207, Type S.

D. Sand Aggregate: ASTM C897.

1. Color for Job-Mixed Finish Coats: As required to match existing.

E. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.
1. Color: Match existing.

2.5 PLASTER MIXES

A. General: Comply with ASTM C926 for applications indicated.

B. Base-Coat Mixes for Use over existing brick: Single base (scratch) coat for two-coat plasterwork on low-absorption plaster bases as follows:

1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 0 to 3/4 part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

C. Job-Mixed Finish-Coat Mixes:

1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 1-1/2 to 2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.

D. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare smooth, solid substrates for plaster according to ASTM C926.

3.3 INSTALLING ACCESSORIES

A. Install according to ASTM C1063 and at locations indicated on Drawings.

B. Reinforcement for External (Outside) Corners:

1. Install lath-type, external-corner reinforcement at exterior locations.

3.4 PLASTER APPLICATION

A. General: Comply with ASTM C926.

1. Do not deviate more than plus or minus 1/4 inch in 10 feet (6 mm in 3 m) from a true plane in finished plaster surfaces when measured by a 10-foot (3-m) straightedge placed on surface.
2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Bonding Compound: Apply on existing brick substrates for direct application of plaster.

C. Walls; Base-Coat Mix: For base (scratch) coat, for two-coat plasterwork and having 3/8-inch (10-mm) thickness on masonry, as follows:

1. Portland cement mix.

D. Plaster Finish Coats: Apply to provide finish to match existing.

3.5 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.6 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 092400

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SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1. Division 1 Section "Submittals" for requirements and submittal formats.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Wood
2. Stucco

B. Related Requirements:

1. Division 1 "Submittal Procedures" for requirements for submittal formats.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:

1. Benjamin Moore & Co.
2. PPG Architectural Finishes, Inc.
3. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

D. Colors: As selected by Architect from manufacturer's full range or as noted on finish schedule.

2.3 METAL PRIMERS

A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.

2.4 SOLVENT-BASED PAINTS

A. Alkyd, Exterior, Semi-Gloss (Gloss Level 5): MPI #94.

2.5 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. The Contractor will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

D. Application of coating indicates acceptance of surfaces and conditions. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Wood: 15 percent.
2. Portland Cement Plaster: 12 percent.

E. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. FIELD QUALITY CONTROL

E. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Wood Substrates: Wood trim and Windows.

1. Alkyd System MPI EXT 6.3B:

a. Prime Coats (2): Primer, alkyd for exterior wood, MPI #5.
b. Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
c. Topcoat: Alkyd, exterior, semi-gloss (MPI Gloss Level 5), MPI #94.

B. Cement Stucco:

1. Latex System MPI EXT 3.1A:

a. Prime Coat: Primer, alkali resistant, water based MPI #3.
b. Prime Coat: Latex, exterior, matching topcoat.
c. Intermediate Coat: Latex, exterior, matching topcoat.
d. Topcoat: Latex, exterior, flat (MPI Gloss Level 1), MPI #10.

END OF SECTION 099113

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