

PROJECT MANUAL

**THIS COPY IS FOR
INFORMATION ONLY.
YOU MUST PURCHASE
THE PROPOSAL TO
SUBMIT A BID**

**DELAWARE STATE HOUSING
AUTHORITY OFFICE RENOVATIONS**

18 The Green
Dover, DE

September 5, 2019

ARCHITECT:
ARCHITECTURAL ALLIANCE
1309 Veale Road, Suite 22
Wilmington, DE 19810
(302) 478-3777
www.archalli.com



ARCHITECTURAL
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SECTION 00 0110

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END OF SECTION

SECTION 01 1000

SUMMARY

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PART 1 GENERAL

1.01 PROJECT

- A. Project Name: DSHA Office Renovations
- B. Owner's Name: Delaware State Housing Authority.
- C. Architect's Name: Architectural Alliance Inc.
- D. The Project shall include the renovation and restoration of the DSHA Administration offices, Buildings 16,18,20,22,24,26 and accessory storage shed as identified on the key plan in the construction drawings. Scope includes facade finish restoration to brick, masonry, stucco, EIFS, metal clapboard siding and decorative ornate wood trim, shutters and windows. Roofing shall include new gutters and downspouts, roof flashing repair/ replacement, shingle roof replacement, membrane roof replacement and coatings. Exterior renovations will involve removal and replacement of the steel fire escape, repairs to the masonry coal chute, new exterior wood frame ramp and demolishing and reconstruction of the existing shed.
- E. The Work of this Contract includes the furnishing of all labor, equipment, materials, and services at The Dover Green, Dover, DE 19901. Seven buildings are scheduled for exterior restoration and rehabilitation projects (refer to Bid Drawing A1.01 for orientation plans). They, and their primary construction materials / methods and configurations are as follows:
 - 1. Building #16 - Two-story wood framed and sided building with attic, facing south, in Carpenter Gothic style with multiple, later-built, modern wings at the rear, and a wooden porch at the front façade. It is across a "fire alley" from Building 18 to its west side.
 - 2. Building #18 - Brick masonry construction, two-story addition to Building 20 with attic and matching historical details to #20. Partially exposed brick, partially covered with EIFS, with a small section of frame construction at the rear.
 - 3. Building #20 - Two and a half story building (with roof dormers) in the Federal period style.; Brick masonry construction covered with stucco and EIFS, with wood-framed gable dormers at the front façade and wood framed shed-dormer at the rear façade. Building 18 and 20 have shingled roofing on slopes of varying steeper pitches, with wooden cornices, dormer faces and cheek walls.
 - 4. Building #22 - Three-stories in the Italianate period style, with a shallow-pitched membrane-covered gable roof, deep projecting cornices, with wooden frieze boards and corbels. Rear El is two-story, constructed of brick and frame rendered in stucco and EIFS, with asphalt shingled roof. Further addition is wood-framed one-story with composite board siding and shallow-pitched membrane roof.
 - 5. Building #24 - Two and a half story (with a garret) brick masonry, three-bay building, facing east, with a brick rear extension, and a wood-framed second floor porch and addition at the far rear. It is across a "fire alley" from Building 22 to its north side. Both alley sides of #24 are exposed brick.
 - 6. Building #26 - Full three-story brick masonry, three bay building with wooden windows and shutters, with a modern renovated, two story brick masonry El at the rear, the south

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wall of which has been previously covered with modern stucco (believed to be EIFS), on the façade facing Bank Lane. The two other El facades are modern brick. It is across a “fire alley” from Building 24 to its north side. It’s facade facing the alley is also covered with EIFS.

7. The Shed is a one-story wood framed and sided building approximately 12 x 16 feet in footprint with a gabled corrugated metal roof on brick masonry piers. It has vernacular carpenter gothic details, including a wooden roof hood projecting over a south wall entry door, supported on wooden brackets.
 - a. A separate Scope of Work is provided for each of these buildings, and is included on the construction drawings for each, and notated to the building elevations. This Specification identifies the materials and methods for each portion of the work as outlined in the Table of Contents. Most Specification Sections are applicable to all of the buildings; some Specification Sections may be applicable to only one or more specific buildings. Together the Drawings and this Specification constitute the Bid Documents.
 - F. All items of demolition and new construction shall be provided by the Contractor, except for Owner-furnished temporary facilities and utilities and non-potable water supply as necessary for execution of the work.
 - G. The Contractor, as part of his work, shall engage the services of a Hauling Contractor, licensed in the jurisdiction of the project, for the proper and legal disposal of the existing materials. The Contractor shall obtain and pay for all permits and fees necessary for and resulting from the work of the Hauling Contractor.
 - H. During the work, the Owner may engage the services of certain specialty consultants to examine and inspect certain aspects of the work which may be discovered. The Contractor, as part of his Work, shall cooperate with and coordinate his work with, that of these specialty consultants.
 - I. Sections 01000, 01100, 01300, 01500 and 01700 of this document describe the General Conditions portions of the work at the seven buildings. Sections 02200 through 09900 of this document specify the list of products and materials to be used in the construction of the project. In the execution of the Work described on the Drawings, the Contractor shall maintain the highest standards of workmanship consistent with high quality construction.
 - J. The Dover Green is a National Register Historic District recognized by the National Park Service, of the U.S. Department of the Interior, since 1976. Due to the historic nature of the buildings, the preservation of original materials is of the greatest importance. All work on these projects must conform to the Secretary of the Interior’s Guidelines for the Treatment of Historic Properties (Restoration and Rehabilitation categories).
 - K. Permits and Licenses -- All permits required by the authorities having jurisdiction shall be obtained and paid for by the Contractor including, but not limited to: demolition, disposal, temporary utilities, and construction, as well as any business privilege fees or permits required to perform the work in the State of Delaware and the City of Dover.
- 1.02 CONTRACT DESCRIPTION
- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 - Agreement Form.

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- B. Sitework will include all work indicated on the drawings and specifications.

1.03 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.04 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Contractor shall have full use of site during the construction period..
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Existing building spaces may not be used for storage.
- D. Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to the hours of 8am and 5pm.
- E. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Prevent accidental disruption of utility services to other facilities adjacent to the site.

1.05 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 2000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.

1.02 SCHEDULE OF VALUES

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- B. Forms filled out by hand will not be accepted.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Execute certification by signature of authorized officer.
- E. Submit Electronic (PDF) copy copies of each Application for Payment via email.

END OF SECTION

SECTION 01 2200

UNIT PRICES

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.02 COSTS INCLUDED

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.03 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.
- B. The quantity of certain construction (as noted on the drawings) cannot be firmly defined until after examination those items during selective demolition. The bidding contractor shall, therefore, provide an allowance, in his base bid prices, for an assumed quantity of material and installation (as noted in paragraph A.1. below and on the plan drawing notes). In addition, unit prices for those items shall be provided on the bid form (see bid form) for the purpose of establishing a fair and equitable method of determining payment for additions to the Contract during construction. Unit prices shall include the costs of all materials, labor, equipment, taxes, overhead and profit for each item, i. e. unit prices are installed costs and are not subject to additional mark-ups. Unit prices to be provided are as follows:
 - 1. Allow \$1,000.00 for the LEVEL 1, Full Restoration of Historic Windows (as noted in specification and on elevations). Contract shall include all delivery, labor, equipment and additional materials, as may be necessary for the provision / installation of said Work items.
 - 2. Allow \$500.00 for the LEVEL 2, Moderate Restoration of 20th century Wooden Windows (as noted in specification and on elevations). Contract shall include all delivery, labor, equipment and additional materials, as may be necessary for the provision / installation of said Work items.
 - 3. Allow \$250.00 for the LEVEL 3, Light Window Restoration of 20th and 21st Century Metal Clad and Vinyl Windows (as noted on elevations). Contract shall include all delivery, labor, equipment and additional materials, as may be necessary for the provision / installation of said Work items.
 - 4. Allow \$500.00 for the LEVEL 4, Window Replacement of severely deteriorated attic windows, with in-kind wood windows to match (as noted on elevations). Contract shall

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include all delivery, labor, equipment and additional materials, as may be necessary for the provision / installation of said Work items

1.04 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Assist by providing necessary equipment, workers, and survey personnel as required.
- C. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- D. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- E. Measurement by Area: Measured by square dimension using mean length and width or radius.
- F. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- G. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.
- H. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.
- I. Contractor's Engineer Responsibilities: Sign surveyor's field notes or keep duplicate field notes, calculate and certify quantities for payment purposes.

1.05 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

1.06 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct one of the following remedies:
 - 1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Architect.
 - 2. The defective Work will be partially repaired to the instructions of the Architect, and the unit price will be adjusted to a new unit price at the discretion of Architect.
- C. The individual specification sections may modify these options or may identify a specific formula or percentage price reduction.

Architectural Alliance, Inc
Wilmington, DE

DSHA Office Renovations
Dover, DE

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PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2300

ALTERNATES

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.03 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - a. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - b. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.04 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

- 3.01 ADD ALTERNATE 01: BLDG 16 RAMP DEMO AND REPLACEMENT

- 3.02 ADD ALTERNATE 02: BLDG 20 RAMP DEMO AND REPLACEMENT

- 3.03 ADD ALTERNATE 03: BLDG 16 MEMBRANE ROOF REPLACEMENT AND PORCH
ROOF COATING

- 3.04 ADD ALTERNATE 04: BLDG 18 SHINGLE REPLACEMENT AND CRICKET

- 3.05 ADD ALTERNATE 05: BLDG 20 SHINGLE REPLACEMENT

- 3.06 ADD ALTERNATE 06: BLDG 22 MEMBRANE ROOF REPLACEMENT

- 3.07 ADD ALTERNATE 07: BLDG 26 SHINGLE REPLACEMENT

- 3.08 ADD ALTERNATE 08: BLDG 16 WINDOW RESTORATION SIDE/ REAR FACADES
(SEE ELEVATIONS)

- 3.09 ADD ALTERNATE 09: BLDG 18 WINDOW RESTORATION SIDE/ REAR FACADES
(SEE ELEVATIONS)

- 3.10 ADD ALTERNATE 10: BLDG 20 WINDOW RESTORATION SIDE/ REAR FACADES
(SEE ELEVATIONS)

- 3.11 ADD ALTERNATE 11: BLDG 22 WINDOW RESTORATION SIDE/ REAR FACADES
(SEE ELEVATIONS)

- 3.12 ADD ALTERNATE 12: BLDG 24 WINDOW RESTORATION SIDE/ REAR FACADES

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(SEE ELEVATIONS)

3.13 ADD ALTERNATE 13: BLDG 26 WINDOW RESTORATION SIDE/ REAR FACADES
(SEE ELEVATIONS)

3.14 ADD ALTERNATE 14: DEMO AND REBUILD STORAGE SHED

END OF SECTION

SECTION 01 3000

ADMINISTRATIVE REQUIREMENTS

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Progress meetings.
- B. Construction progress schedule.
- C. Coordination drawings.
- D. Submittals for review, information, and project closeout.
- E. Number of copies of submittals.
- F. Submittal procedures.

1.02 PROJECT COORDINATION

- A. During construction, coordinate use of site and facilities through the Project Coordinator.
- B. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- C. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- D. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- E. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

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PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, Owner, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Maintenance of progress schedule.
 - 7. Corrective measures to regain projected schedules.
 - 8. Planned progress during succeeding work period.
 - 9. Maintenance of quality and work standards.
 - 10. Effect of proposed changes on progress schedule and coordination.
 - 11. Other business relating to Work.
- E. Architect to record minutes and provide electronic (PDF) copy to distribution list via email.

3.02 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- B. Within 10 days after joint review, submit complete schedule.
- C. Submit updated schedule with each Application for Payment.

3.03 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.

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- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents. Approval of submittals does not relieve the contractor from providing the product or design as specified in the documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. The Contractor shall prepare test panels (mock-ups) for certain materials listed here, at locations to be designated by the Architect and/or Owner for approval of material, workmanship, color, texture, etc. as required for approval. The Contractor shall prepare up to three (3) test panels as are required to obtain approval of the Architect and Owner, at no additional cost to the Owner. Approved test panels may become part of the finished work, where possible, and shall serve as the standard for all other work of that type.

3.04 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.05 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.06 SUBMITTAL PROCEDURES

- A. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Use of reproductions of the Contract Documents in digital data form to create shop drawings is only permitted as defined With a signed liability release form provided to the design professional..
- B. Transmit each submittal with a copy of approved submittal form.

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- C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- F. Deliver submittals to Construction Manager at business address.
- G. Schedule submittals to expedite the Project, and coordinate submission of related items.
- H. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- I. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- J. Provide space for Contractor and Architect review stamps.
- K. When revised for resubmission, identify all changes made since previous submission.
- L. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- M. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 3100

PROJECT COORDINATION AND DOCUMENT REVIEW

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and other Contract Documents, listed in the agreement between the Owner and Contractor, apply to this Section.

1.02 SUMMARY

- A. Section includes provisions for coordination and review of shop drawings and document review for Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Shop drawing procedures.
 - 3. Contract document review
- B. All contractors and all subcontractors shall participate in the work of this section.
- C. The work of this section shall be coordinated with and in addition to the work specified in all Contract Documents, including but not limited to Division 1 documents, all individual sections for this project, and the drawings.

1.03 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in 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 ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination shall also include all drawings for the project.

1.04 SHOP DRAWINGS REQUIREMENTS

- A. In addition to shop drawing requirements set forth in Division 1 and individual sections the following shall apply:
 - 1. Show the relationship of materials specified in all sections with all adjacent materials and products.
 - 2. Indicate, show and detail the area between the materials specified and all adjacent materials, and how they are being constructed and finished.

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- B. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination. If coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.05 CONTRACT DOCUMENT REVIEW

- A. In addition to Contract Document review procedures set forth in Division 1 and individual sections the following shall apply:
1. All Contractors and Subcontractors are required to review all contract documents, including all drawings and all specifications.
 2. If a contractor or subcontractor fails to perform these actions, they shall be accountable for the information contained on the drawings and in the specifications.
 3. The Contractor shall report in writing to the Architect any errors, inconsistencies or omissions discovered. Contractor's findings shall also include all subcontractor's findings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

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PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Submittal procedures.
 - 2. Construction progress schedules.
 - 3. Proposed products list.
 - 4. Product data.
 - 5. Shop drawings.
 - 6. Samples.
 - 7. Design data.
 - 8. Test reports.
 - 9. Certificates.
 - 10. Manufacturer's instructions.
 - 11. Manufacturer's field reports.
 - 12. Construction photographs.

1.02 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect accepted form.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Architect has the right to reject submittals if there is no signed or initialed review stamp by the Contractor.
- F. Schedule submittals to expedite the Project. Coordinate submission of related items for delivery at the same time.
- G. Make submittals to parties as scheduled in this Section.
- H. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.
- I. Provide space for Contractor and Architect review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.

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- K. Distribute copies of reviewed submittals to affected parties. Instruct parties to promptly report any inability to comply with requirements.
- L. Incomplete submittals will not be processed.
- M. Submittals not requested will not be recognized or processed.
- N. Contractor may not e-mail architect submittals unless approved by Architect.

1.03 SUBMITTAL PROCESSING

- A. Allow sufficient review and transmittal time for each submittal so the Work is not delayed as a result of time required to process submittals, including time for re-submittals.
- B. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly notify the Contractor when a submittal being processed must be delayed for coordination.
- C. When an intermediate submittal is necessary, process the same as the initial submittal.
- D. Allow two weeks for processing each re-submittal.
- E. No extension of Contract Time will be permitted because of failure to transmit submittals to Architect sufficiently in advance of the Work to permit processing.

1.04 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit preliminary outline Schedules within 15 days after date of Owner-Contractor Agreement for coordination with Owner's requirements. After review, submit detailed schedules within 15 days modified to accommodate revisions recommended by Architect.
- B. Submit revised Progress Schedules with each Application for Payment.
- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other affected parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit a horizontal bar chart with separate line for each major portion of Work or operation section of Work, identifying first work day of each week.
 - 1. Show complete sequence of construction by activity, identifying Work of separate
 - 2. stages and other logically grouped activities.
- F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- G. Revisions To Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.

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2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
3. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate contractors.

1.05 PROPOSED PRODUCTS LIST

- A. Within 15 days after date established in Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. When proposed products are one of the products specified by manufacturer, and model number, additional submittals for that product are not required except as follows:
 1. Shop drawings are required for products specially fabricated to size or configuration to comply with project conditions.
 2. Samples are required for products where color, texture, finish, pattern and other selections must be made.
 3. Manufacturer's Installation Instructions are required for products where specified.
- C. For products specified only by reference standards, give manufacturer, trade name, model or
 1. catalog designation, and reference standards.

1.06 PRODUCT DATA

- A. Product Data: Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- B. Submit shop drawings in the form and quantities as scheduled in this Section. Reproducible transparency will be returned.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. Material Safety Data Sheets (MSDS) are not permitted as submittal in lieu of required product information.
 1. When requested by Owner, submit MSDS directly to Owner.
- F. After review provide and distribute copies in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01700.

1.07 SHOP DRAWINGS

- A. Shop Drawings: Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

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- B. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components depicted on shop drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by Authorities having jurisdiction.
- C. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Submit shop drawings in the form and quantities as scheduled in this Section. Reproducible transparency will be returned.
- E. After review provide and distribute copies in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 7000.

1.08 SAMPLES

- A. Samples: Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
- B. Samples For Selection as Specified in Product Sections:
 - 1. Submit to Architect for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect selection. Include custom colors and other Product characteristics where specified.
 - 3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01700.
- C. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work where aesthetic selections are required so related samples are submitted at same time.
- D. Include identification on each sample, with full Project information.
- E. Submit the number of samples specified in individual specification sections; one of which will be retained by Architect.
- F. Reviewed samples which may be used in the Work are indicated in individual specification sections.
- G. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.09 DESIGN DATA

- A. Submit for the Architect's knowledge as contract administrator or for the Owner in quantities as scheduled in this Section.

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- B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.10 TEST REPORTS

- A. Submit for the Architect's knowledge as contract administrator or for the Owner in quantities as scheduled in this Section.
- B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.11 CERTIFICATES

- A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Architect, in quantities as scheduled in this Section.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

1.12 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect for delivery to Owner in quantities as scheduled in this Section.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.13 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for the Architect's benefit as contract administrator or for the Owner in quantities as scheduled in this Section.
- B. Submit report in duplicate within 5 days of observation to Architect for information.
- C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.14 ERECTION DRAWINGS

- A. Submit drawings for the Architect's benefit as contract administrator or for the Owner in quantities as scheduled in this Section.
- B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

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- C. Data indicating inappropriate or unacceptable Work may be subject to action by the Architect or Owner.

PART 2 PRODUCTS

2.01 Not Used.

PART 3 EXECUTION

3.01 SUBMITTAL SCHEDULE

- A. Provide the following quantities of submittals unless a larger quantity is specified in individual sections of the specification.
- | 1. Submittal Type | Copies Required |
|--------------------------------|-------------------------|
| a. Product Data | DCC Electronic format |
| b. Shop Drawings | DCC Electronic format |
| c. Samples | 1 minimum and 2 maximum |
| d. Design Data | DCC Electronic format |
| e. Test Reports | DCC Electronic format |
| f. Certificates | 2 |
| g. Manufacturers Instructions | 2 |
| h. Manufacturers Field Reports | 2 |
2. Submittal Sheet Size: Except for templates, patterns and similar full-size drawings, provide
- a. submittals on sheets at least 8-1/2 x 11 inches, but no larger than 30 x 42 inches in size.

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References and standards.
- B. Quality control.
- C. Control of installation.
- D. References
- E. Tolerances.
- F. Testing and inspection services.
- G. Examination
- H. Preparation

1.02 REFERENCE STANDARDS

- A. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2010.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Testing Agency Qualifications:
 - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.

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- f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Conformance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.

1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.04 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

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1.05 TESTING AND INSPECTION AGENCIES

- A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

- A. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.

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2. Perform specified sampling and testing of products in accordance with specified standards.
3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
5. Perform additional tests and inspections required by Architect.
6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the Work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:

1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To facilitate tests/inspections.
 - c. To provide storage and curing of test samples.
4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.04 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

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PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Temporary Utilities.
 - 2. Construction Facilities.
 - 3. Temporary Controls.
 - 4. Removal of utilities, facilities, and controls.

1.02 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.
- B. Supplement power service capacity and characteristics as required.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
- D. Permanent convenience receptacles may not be utilized during construction.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide and maintain 0.25 watt/sq ft lighting to interior work areas after dark for security purposes.
- D. Provide local lighting as required.
- E. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- F. Maintain lighting and provide routine repairs.
- G. Permanent building lighting may be utilized during construction.

1.04 TEMPORARY HEATING AND COOLING

- A. Provide and pay for heating and cooling devices. Heat and cool as needed to maintain specified conditions for construction operations.

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- B. Do not use permanent HVAC equipment for construction heating or cooling purposes. Provide and pay for HVAC devices, operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.
- D. When specified in other sections, maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress.
- E. When specified in other sections, operate heating and cooling system to maintain interior temperature and relative humidity design conditions required for completed construction.

1.05 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Do not use permanent ventilation equipment. Provide equipment with temporary fan units as required to maintain clean air for construction operations.

1.06 TELEPHONE SERVICE

- A. Provide, maintain and pay for telephone service to field office at time of project mobilization.

1.07 INTERNET / EMAIL SERVICE

- A. Provide, maintain and pay for internet service and email to field office at time of project mobilization.

1.08 TEMPORARY WATER SERVICE

- A. Provide, maintain and pay for suitable quality water service required for construction operations.
- B. Exercise measures to conserve water.
- C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation and heat trace as required to prevent freezing.

1.09 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures at time of mobilization.
- B. Use of permanent facilities during construction is not permitted.

1.10 FIELD OFFICES AND MATERIAL STORAGE

- A. Use of permanent facilities for field offices or storage is not permitted.
- B. Owner to provide space for Project meetings, with table and chairs to accommodate 10 persons.

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- C. Office spaces shall be ready for occupancy 15 days after date fixed in Notice to Proceed.
- D. Locate offices and sheds a minimum distance of 30 feet from new structures.
- E. Storage Areas And Sheds: Size to storage requirements for products of individual Sections allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01600.
- F. Preparation: Fill and grade sites for temporary structures to provide drainage away from buildings.
- G. Maintenance And Cleaning:
 - 1. Weekly janitorial services for offices; periodic cleaning and maintenance for office and storage areas.
 - 2. Maintain approach walks free of mud, water, and snow.
- H. Storage of building materials shall be arranged with Owner for locations on site for storage of exterior materials; and interior locations for storage of certain materials requiring protection from element.

1.11 VEHICULAR ACCESS AND PARKING

- A. Provide temporary gravel surface parking areas to accommodate construction personnel.
- B. Provide unimpeded access for emergency vehicles.
- C. Provide and maintain access to fire hydrants and control valves free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Designated existing on-site roads may be used for construction traffic. Tracked vehicles not allowed on paved areas.
- F. Do not allow heavy vehicles or construction equipment in parking areas.
- G. Designate one parking space for the Architect.
- H. Maintenance:
 - 1. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
 - 2. Maintain permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

1.12 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

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- C. Keep streets and sidewalks clear of construction materials and waste in accordance with City codes and ordinances.
- D. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- E. Collect and remove waste materials, debris, and rubbish from site minimum weekly and legally dispose off-site.
- F. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.13 TRAFFIC REGULATION

- A. Maintain pedestrian traffic on sidewalks. Provide barriers as specified in this section.
- B. Signs, Signals, And Devices: As required by local jurisdictions.
- C. Haul Routes:
 - 1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
 - 2. Confine construction traffic to designated haul routes.
 - 3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

1.14 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Protect existing facilities and finishes outside Project area subject to construction traffic and construction operations necessary to complete the Work. Repair damage to existing facilities and finishes.
- C. Provide barricades and covered walkways required by governing authorities for public rights--of-way and for public access to existing building.
- D. Provide protection for plants designated to remain. Replace damaged plants.
- E. Protect non-owned vehicular traffic, stored materials, site, and structures from damage

1.15 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

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1.16 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.17 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.18 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise from and noise produced by construction operations.

1.19 PEST CONTROL

- A. Provide methods, means, and facilities to prevent pests and insects from entering the facility.

1.20 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations

1.21 RODENT CONTROL

- A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.22 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary facilities and controls, except those required for the field offices and sheds prior to Substantial Completion.
- B. Remove remaining temporary facilities and controls prior to Final Application for Payment inspection.
- C. Remove temporary buildings, foundations, and utility services. Restore areas.
- D. Remove temporary site access and parking when permanent paving is usable.

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- E. Remove temporary signs, framing, supports, and foundations.
- F. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- G. Clean and repair damage caused by installation or use of temporary work.
- H. Restore existing facilities used during construction to original condition.
- I. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

2.01 Not Used.

PART 3 EXECUTION

3.01 Not Used.

END OF SECTION

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SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.

1.02 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. DO NOT USE products having any of the following characteristics:
 - 1. Made outside the United States, its territories, Canada, or Mexico.
 - 2. Made using or containing CFC's or HCFC's.
 - 3. Containing lead, cadmium, asbestos.
- C. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
 - 3. Have a published GreenScreen Chemical Hazard Analysis.

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2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named. Provide full Data on substitution and on the originally specified product noting the differences.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- E. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- G. Substitution Submittal Procedure:
 - 1. Submit two copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. The Architect will notify Contractor in writing of decision to accept or reject request.
 - 4. Costs associated with changes in the contract documents to accommodate substitutions shall be borne by the Contractor.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

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- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- G. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Do not store products directly on the ground.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

END OF SECTION

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Wilmington, DE

DSHA Office Renovations
Dover, DE

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SECTION 01 7000

EXECUTION AND CLOSEOUT REQUIREMENTS

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Cutting and patching.
- D. Cleaning and protection.
- E. Starting of systems and equipment.
- F. Demonstration and instruction of Owner personnel.
- G. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- H. General requirements for maintenance service.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.02 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

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- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.03 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Relocate items indicated on drawings.
 - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. Provide temporary connections as required to maintain existing systems in service.
 - 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- D. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

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- E. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material with a neat transition to adjacent finishes.

3.04 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove and replace defective and non-conforming work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Restore work with new products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- H. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.05 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

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- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site daily and dispose off-site; do not burn or bury.
- E. Collect and remove waste materials, debris, and rubbish from site minimum weekly and legally dispose off-site.
- F. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

3.06 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

3.07 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.08 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Use cleaning materials that are nonhazardous.

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- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, wax vct flooring, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover names, labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.09 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect and Owner.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- G. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.10 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.

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- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

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SECTION 01 7800

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.

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2. Specifications.
 3. Addenda.
 4. Change Orders and other modifications to the Contract.
 5. Reviewed shop drawings, product data, and samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Field changes of dimension and detail.
 2. Details not on original Contract drawings.
- 3.02 OPERATION AND MAINTENANCE DATA
- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- 3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES
- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- 3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS
- A. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

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- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions, and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- D. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- E. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- F. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

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- D. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- E. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 02 2000

EARTHWORK

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PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
 - 1. Filling and backfilling to attain indicated grades.
 - 2. Excavation, rough and finish grading.
 - 3. Furnishing and installing graded aggregate base course material for pavements, hot-mix patches, and other structures.
 - 4. Undercut excavation and furnishing graded aggregate base course for undercut excavation.
 - 5. Furnishing excavation support systems, as required, including shoring and bracing.
 - 6. Excavation for trenches.
 - 7. Preparing topsoil stripped from the site and placing topsoil in locations requiring seeding or sodding.

- B. Definitions
 - 1. Excavation: removal and disposal of all material encountered when establishing required grade elevations, including pavements and other obstructions visible on the ground surface, and underground structures and utilities indicated to be demolished and removed, and unsuitable subgrade material.
 - 2. Unauthorized excavation: Removal of materials beyond specified subgrade elevations without approval of the Engineer.

1.02 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies
 - 1. All excavations shall be in compliance with Federal Occupational Safety and Health Act.
 - 2. Excavation work shall be in compliance with application requirements of other governing authorities having jurisdiction.

- B. Standards
 - 1. Refer to the following sections in the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2001. (Hereinafter referred to as the "Standard Specifications")
 - a. Section 202: Excavation and Embankment
 - b. Section 205: Rock Excavation for Roadway
 - c. Section 206: Rock Excavation for Structures and Trenches.
 - d. Section 207: Excavation and Backfill for Structures
 - e. Section 208: Excavation and Backfill for Pipe Trenches
 - f. Section 209: Borrow
 - g. Section 210: Furnishing Borrow Type "C" for Pipe, Utility Trench

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- h. Section 212: Undercut Excavation
- i. Section 302: Graded Aggregate Base Course
- j. Section 732: Topsoil
- k. Section 733: Topsoiling
- l. Section 813: Grading Requirements Minimum and Maximum Percentages Passing
- m. Section 821: Graded Aggregates
- 2. American Society for Testing and Materials (ASTM),
 - a. D-1556: Density of Soil in Place by the Sand-Cone Method.
 - b. D-698: Moisture Density Relations of Soils and Soil Aggregate Mixtures
 - c. D-2049: Relative Density of Cohesionless Soils.
 - d. D-2166: Unconfined Compressive Strength of Cohesive Soil.
 - e. D-2922: Density of Soil and Soil Aggregate in Place by Nuclear Methods)

1.03 SUBMITTALS

- A. Material certification and delivery slips for:
 - 1. Select Borrow
 - 2. Graded Aggregate Base Course

1.04 JOB CONDITIONS

- A. Existing Utilities
 - 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility Owner.
 - 2. Do not interrupt existing utilities serving facilities occupied and used by the Owner.
 - 3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
- B. Use of Explosives: The use of explosives is not permitted unless approved by the Engineer.
- C. Protection of Persons and Property
 - 1. Barricade open excavations occurring as part of this work and post with warning signs as required to protect persons on the site.
 - 2. Protect trees, shrubs, lawns and other features remaining as part of final landscaping.
 - 3. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement undermining, washout and other hazards created by earthwork operations.
 - 4. In the event of damage, immediately make all repairs and replacements to the approval of the Engineer at no cost to the Owner.
- D. Dust Control
 - 1. Control dust on and near the work if such dust is caused by the Contractor's operations during performance of the work or if resulting from the conditions in which the Contractor leaves the site.
 - 2. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

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- E. Weather Conditions: Do not place, spread, or roll fill material during freezing, raining, or otherwise unfavorable weather conditions.

PART 2 PRODUCTS

2.01 GENERAL

- A. For approval of borrow materials, at least five (5) working days in advance of intention to import material, designate the proposed borrow area, and provide material certifications or samples to prove the quality and suitability of the material.

2.02 ON-SITE FILL

- A. All on-site materials used for fill shall be acceptable to the Engineer and shall be minimally subject to the following requirements:
1. Free from deleterious substances, stumps, brush, weeds, roots, sod, rubbish, garbage and matter that may decay.
 2. Free of large rocks or lumps that may create voids or prevent proper compaction.

2.03 BORROW FILL MATERIAL

- A. Free from deleterious substances, stumps, brush, weeds, roots, sod, rubbish, garbage and matter that may decay, and shall be Borrow Type "G" (Select Borrow), grade IV or V, conforming to Section 209 of the Standard Specifications.

2.04 TRENCH AND CIVIL STRUCTURE BACKFILL MATERIAL

- A. Backfill for civil structures shall conform to the requirements of Section 207 of the Standard Specifications.
- B. Backfill for trenches shall conform to the requirements of Section 208 of the Standard Specifications.
- C. All trench and civil structure backfill material shall meet the requirements of Section 209.03C of the Standard Specifications for Borrow Type C backfill. All suitable excavated material which meets the requirements of Section 209.03C of the Standard Specifications shall be used for structure or trench backfill as far as practicable.

2.05 GRADED AGGREGATE BASE COURSE

- A. Graded Aggregate base course for bituminous and concrete pavements and other structures shall be Type "B" conforming to the requirements for Graded Aggregate in Section 821 of the Standard Specifications.

2.06 TOPSOIL

- A. Topsoil furnished from within or outside the project limits shall conform to Section 732 of the Standard Specifications except as modified by the following requirements.

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1. Topsoil shall not contain stones, lumps, roots or other objects larger than one-half inch in any dimension.
 2. Acid-Alkaline Range: pH 5.8 to 6.5.
 3. Free of pests, pest larvae, and matter toxic to plants.
 4. Maximum soluble salts: 500 ppm
 5. Free of viable Bermudagrass, quackgrass, Johnsongrass, nutsedge, poison ivy, Canada thistle, and other objectionable grassy or broadleaf weeds.
- B. Topsoil Furnished from Outside Project Limits
1. Gradation range:
 - a. Sand (2.00 mm to 0.05 mm) 40-80 percent
 - b. Silt (0.050 mm to 0.005 mm) 10-30 percent
 - c. Clay (0.005 mm and smaller) 10-30 percent
 - 1) When one-half of the sand content is larger than 0.500 mm, the maximum sand content shall be seventy-five percent; and maximum clay content shall be fifteen percent.
 - 2) Lower limits of silt and clay shall be flexible to extent that soils with minimum combined silt and clay content of twenty percent shall be satisfactory. However, if more than one-half of the sand is larger than 0.50 mm., then minimum clay content shall be fifteen percent, or the minimum combined silt and clay content shall be twenty-five percent.
 2. Organic content:
 - a. Minimum of 2.75 percent by weight.
 - b. If necessary, add peat at rate necessary to attain minimum organic content.

PART 3 EXECUTION

3.01 INSPECTION BY CONTRACTOR

- A. Examine the areas and conditions under which excavating, filling and grading are to be performed. No extra cost or time allowances will be granted for conditions existing and visible at the time of the bid opening.

3.02 PREPARATION

- A. Prior to commencement of work, establish location and extent of all utilities in the work areas. Maintain and protect, as required, existing utilities which pass through the work area.
- B. Prior to excavation in pavement areas, saw cut existing pavement in accordance with Section 02512 of these Specifications.

3.03 EXCAVATION

- A. Unauthorized Excavation
 1. Unauthorized excavation shall not be at the Owner's expense. Under roadways and pipes, fill unauthorized excavation by removing all loosened material and providing select material as required to attain a firm and unyielding subgrade and/or foundation and to attain required grade elevations.

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- B. Rock Excavation
1. Rock Excavation shall apply to the removal of bedrock and ledgerock which cannot be accomplished without blasting or the use of rippers and the use of disposal of such material. Excavation of material classified as "rock" shall conform to the requirements of Section 205 of the Standard Specifications.
- C. Rock Excavation for Structures and Trenches shall apply to the removal, use or disposal of all boulders or other detached stones having a volume of 1/3 cubic yard or more. Excavation of such material shall conform Section 206 of the Standard Specifications.
- D. Undercut Excavation
1. If unsuitable bearing materials are encountered at the required subgrade elevations notify the Engineer immediately.
 2. Unstable bearing materials shall be removed to a depth of one foot below subgrade and replaced with graded aggregate base course Type B.
 3. Base course shall be placed in six inch lifts.
- E. Stability of Excavations
1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space.
 2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- F. Shoring and Bracing
1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
 2. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction
 3. Maintain shoring and bracing in excavations regardless of time period excavations will be open.
 4. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage.
 5. In the event of damage to such improvements, immediately make all repairs and replacements necessary at no additional cost to the Owner.
 6. Arrange bracing, sheeting and shoring so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength.
 7. Exercise care in the drawing and removal of sheeting, shoring, bracing and timbering to prevent collapse and caving of excavation faces being supported.
- G. Dewatering
1. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding the project site and surrounding area.
 2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water from excavations.

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3. Convey water removed from excavations and rain water to collecting or runoff areas which are not subject to erosion. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

H. Material Storage

1. Stockpile satisfactory excavated materials where directed until required for use as backfill or fill. Place, grade and shape stockpiles for proper drainage.
2. Locate and retain soil materials away from edge of excavations.
3. Dispose of excess soil material and waste materials as herein specified. Excavated material unsuitable for backfilling shall be kept separate from other materials excavated, and disposed of. Materials suitable for backfilling shall not be disposed of until completion of filling or backfilling operations.

I. Excavation for Pavements and Pavement Patches

1. Cut surface under pavements to comply with cross- sections, elevations and grades as shown.

J. Excavation for Trenches

1. Dig trenches to the uniform width required for the particular item to be installed sufficiently wide to provide ample working room. Trench width to a point no less than two feet (2') above the outside top of pipe shall be the pipe outer diameter plus twenty-four inches (24").
2. Excavate trenches to the depth indicated or required. Carry the depth of trenches for piping to establish the indicated flow lines and invert elevations. Beyond the building perimeter, keep bottoms of trenches for which elevations are not given sufficiently below finish grade to avoid freeze-ups.
3. Trenches for pipes shall not be opened more than the number of linear feet of pipe that can be placed and backfilled in one (1) day.
4. Grub roots and stumps within six inches (6") of outside surface of pipe bottom and sides to minimum depth of six inches (6") below grade. Backfill trenches with concrete where trench excavations pass within eighteen inches (18") of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footing.
5. Pipe bedding shall be as shown on the Plans.

K. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than thirty-five degrees (35°).

3.04 BACKFILL FILL AND COMPACTION

A. General

1. The project Inspector or Engineer shall be notified 24 hours in advance of any fill, backfill or compaction operations.
2. Place acceptable material in 8" lifts to required subgrade elevations.
3. Fills: Use suitable material (per Section 2.2 or 2.3 of this section) obtained from on-site excavation, except use borrow material when suitable on-site material is not available or when specified by the Engineer or shown on the Plans.

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4. Backfilling: Use suitable material (per Section 2.2 or 2.3 of this section) obtained from on-site excavation, except use select backfill where indicated on Plans, backfill to a height of two feet (2') above the top of pipe with earth free from stones, rock fragments, dirt clogs or frozen material greater than two inches (2") in largest dimension.
 5. Do not provide additional off-site borrow material until all acceptable excavated materials on the site have been utilized in the work unless approved by the Engineer.
 6. Place the various types of materials in the areas as designated on the Plans.
- B. Backfill excavation as promptly as work permits, but not until completion of the following:
1. Inspection, testing, approval and recording locations of underground utilities.
 2. Removal of concrete formwork.
 3. Removal of shoring and bracing, and backfilling of voids satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
 4. Removal of trash and debris.
 5. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
- C. Backfilling Prior to Approvals
1. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner.
 2. After the work has been completely tested, inspected and approved, make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.
- D. Ground Surface Preparation Prior to Filling
1. Remove all vegetation, debris, topsoil, unsatisfactory soil materials, obstructions and deleterious materials from existing ground surface to a depth of not less than four inches (4") and not more than six inches (6") prior to placement of fills. Plow, strip or break-up sloped surfaces steeper than one (1) vertical to four (4) horizontal to a depth of not less than six inches (6") so that fill material will bond with existing surface.
 2. When existing ground surface has a density less than that specified under "Compaction," for the particular area classification, break up the ground surface, pulverize, moisture condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- E. Placement and Compaction
1. Place backfill materials in layers not more than eight inches (8") in loose depth.
 2. Control soil compaction during construction providing minimum percentage of density specified for each area classification listed below.
 3. Pavement areas are defined, for the purpose of this Section, as extending a minimum of five feet (5') beyond the pavement.
 4. Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D-1557; and not less than the following percentages of relative density determined in accordance with ASTM D-2049, for soils which will not exhibit a well-defined moisture-density relationship.
 - a. Lawn or Unpaved Areas: Compact top six inches (6") of subgrade and each layer of backfill or fill material at 90 percent (90%) maximum dry density.

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- b. Walkways: Compact top six inches (6") of subgrade and each layer of backfill or full material at 95 percent (95%) maximum dry density or 90 percent (90%) relative dry density.
 - c. Pavement Areas: Compact top twelve inches (12") of subgrade and each layer of backfill or fill material at 95 percent (95%) maximum dry density or 90 percent (90%) relative dry density.
 - d. Base Course Materials: Compact each layer of base course material to 95 percent (95%) of maximum dry density.
 - e. Trench Stabilization Materials: Compact each layer of material to 95 percent (95%) of maximum dry density.
5. Moisture control:
- a. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to the surface of the subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
 - b. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - c. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.
 - d. Moisture condition fill materials to within 3 percent (3%) of the optimum moisture. Fill that is so wet that it is unstable under compaction equipment shall be dried and re-compacted to achieve a stable fill.
6. Puddling or jetting will not be permitted.
7. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice, or other unsuitable materials.
8. Place backfill and fill material evenly adjacent to structures, to be required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.
9. Compact backfill to height of two feet (2') above top of pipe using approved flat-faced mechanical tampers.

3.05 GRADING

A. General

1. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Building Lines

1. Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
 - a. Lawn or unpaved areas: Finish area to receive topsoil to within not more than 0.10 feet above or below the required subgrade elevations.
 - b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 feet above or below the required subgrade elevation.

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- c. Pavement: Shape surface of areas under pavement line grade and cross-section with finish surface not more than one half (1/2) inch above or below the required subgrade elevation. All topsoil and other unsuitable material shall be removed and replaced with suitable backfill.

C. Compaction

1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

D. Treating after Grading

1. After grading is completed, permit no further excavating, filling or grading.
2. Prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

E. Subgrade Preparation

1. All subgrade preparation shall be performed in accordance with the applicable Sections of the Delaware Department of Transportation Standard Specifications except as may be modified by this Specification Section.
2. Subgrades for paving shall be firm and unyielding when proof-rolled in accordance with Section 202 of the Standard Specifications.

3.06 GRADED AGGREGATE BASE COURSE

A. General

1. Base Course consists of placing graded aggregate base course material in layers of specified thickness over subgrade surface to support pavements, pavement patches and civil structures, as shown on Plans.
2. Provide Base Course in accordance with Section 302 of the Standard Specifications, except as otherwise modified by this Specification Section.

B. Grade Control

1. During construction, maintain lines and grades including crown and cross-slope of base course.

C. Placing

1. Place base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting base course material during placement operations.
2. When a compacted base course is shown to be eight inches (8") or less, place material in a single layer. When shown to be more than eight inches (8") thick, place material in equal layers, except no single layer shall be more than eight inches (8") in thickness when compacted.
3. Spread, shape and compact all base course material deposited on the subgrade during the same day.

3.07 FIELD QUALITY CONTROL

- A. Quality control testing during construction. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

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- B. If subgrade or fills, which have been placed, are below specified density, provide additional compaction and testing at no expense to the Owner. This shall include compaction and testing at areas initially tested and at other locations as directed.

3.08 MAINTENANCE

A. Protection of Graded Areas

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
2. Repair and establish grades in settled, eroded and rutted areas to specified tolerances.

B. Reconditioning Compacted Areas

1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.

3.09 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Remove waste materials, including excess and unacceptable excavated material, trash and debris, and dispose of it off of the Owner's property.

3.10 TOPSOILING

A. Preparation

1. Verify that clearing, earthwork, grading and other preceding work affecting ground surface have been completed and that the area to be top-soiled is cleared, shaped, and dressed.
2. Preparation of Topsoil Subsoil
 - a. Shape and dress area to be top-soiled. This work includes grading to required lines and elevations; removal of all stones, clods, lumps two inches or larger in any dimension; removal of all wires, cables, pieces of concrete, tree roots, and debris or other unsuitable material.
 - b. Do not proceed with installation of topsoil until this work has been approved.

B. Installation

1. Place in even layers that will produce the minimum compacted thickness as indicated on the Plans.
2. If quantity of topsoil obtained from stripping is insufficient for the project requirements, provide required topsoil from approved sources located outside project limits.
3. Remove stones, lumps, roots and other objects larger than one-half inch in any dimension from graded topsoil surface.

C. Maintenance

1. Immediately before establishment of ground cover, re-topsoil and re-grade areas which become eroded or otherwise disturbed.
2. Perform all maintenance work in accordance with the Specifications without additional compensation.
3. Maintenance period to extend until installation of ground cover.

D. Cleaning

1. Immediately clean spills, soil, and conditioners on paved and finished areas.
2. Haul and dispose of topsoil in excess of the quantity required for the project off site.
3. Dispose of protective barricades and warning signs at termination of maintenance period.

END OF SECTION

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SECTION 02 2010

SELECTIVE DEMOLITION

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PART 1 - GENERAL

- 1.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:
- A. Buildings #16, #18, #20, #22, #24, #26:
 - 1. Removal and reinstallation of shutters for restoration and painting at various locations, where noted.
 - 2. Removal and reinstallation of downspouts for drain testing, general restoration and painting.
 - 3. Removal of existing metal fire escape at east (rear) elevation of Building 22.
 - 4. Removal and relocation of low-voltage wiring at rear courtyard of Building 22 (by Owner).
 - 5. Removal of deteriorated basement areaway doors at west elevation of Building 26, in preparation for replacement.
 - 6. Removal of deteriorated or incorrect materials at various locations where noted for replacement.
 - 7. Removal of existing wooden ramp, including posts, footings framing and decking in preparation for installation of a concrete ramp.
 - B. Storage Shed
 - 1. Removal of section of north wall (previously altered) for new framed opening and installation of roll-up door.
 - 2. Removal of existing wooden ramp, including posts, footings framing and decking in preparation for larger ramp.
- 1.02 RELATED SECTIONS
- A. Section 04500 - Masonry Cleaning & Restoration
 - B. Section 05200 - Architectural Metalwork
 - C. Section 07900 - Metal Flashing & Sealants
 - D. Section 08200 - Window & Door Restoration
- 1.03 REFERENCES
- A. ANSI A10.6-2006 and Standard 241-1990, "Safeguarding Building Construction and Demolition Operations," 1981, National Fire Protection Association (NFPA).
 - B. Applicable governmental agency rules and regulations.

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1.04 SUBMITTALS

- A. The Contractor shall submit copies of all permits for transport and disposal of debris.

1.05 MATERIALS HANDLING AND DISPOSAL

- A. Salvaged materials to be re-installed shall be carefully removed and stored on-site until needed. Clean salvaged materials and components of miscellaneous debris, mortar, adhesives, etc. in preparation for re-use. Damage to salvaged materials shall be corrected by the Contractor to the satisfaction of, and at no additional cost to, the Owner.
- B. Salvaged materials to be restored and/or refinished shall be carefully removed and safely delivered to off-site facilities for cleaning, restoration and refinishing, then delivered back to the project and re-installed in the most expedient means possible.
- C. Any materials of historical value uncovered in the course of this work shall be retained for delivery to the Owner. The Contractor shall stockpile items of possible historical value for review by the Architect prior to permanent disposal. The salvage value of all other demolished materials shall accrue to the contractor unless otherwise indicated.
- D. The Contractor shall dispose of all waste materials, packaging and debris resulting from the work of this Section in accordance with the applicable federal, state, and local environmental regulations.

1.06 PROJECT / SITE CONDITIONS

- A. The Contractor shall protect adjacent building assemblies which are to remain and that are not a part of the work of this section, during the course of demolition. Any damage to building components caused by the work of this section shall be corrected by the Contractor at no additional cost to the Owner. At a minimum the Contractor shall:
1. Protect adjacent materials during the removal and installation of nearby material units.
 2. Protect windows from airborne debris and other damage. Provide flexible or rigid barriers in front of windows while work is in progress.
 3. Provide rigid, waterproof protection where doors and windows are removed to exclude the elements and prevent unauthorized access to the building.
 4. Verify abandonment of all mechanical and electrical appurtenances prior to removal.
 5. Protect existing roof replacement areas against leaks, to prevent water damage to interiors during the course of the work.
 6. Protect building entrances and stairs from damage by equipment, scaffolding or falling debris from overhead work.
- B. Protect building users and the public during demolition operations. Provide temporary barriers, tape and signage as required to exclude non-Contractor personnel from the work areas.
- C. The Contractor shall ensure that existing structural framing is not overloaded during demolition and removal of structural elements. Do not stockpile debris and waste materials around demolition areas.

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PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The Contractor shall maintain an adequate supply of waterproof tarpaulins, plywood, and other protective materials at the job site for immediate use.
- B. The Contractor shall control dust during demolition operations by periodically dampening the work area with water mist. Protect doors, windows, and HVAC intakes from construction dust.
- C. Coordinate access and egress for building users with the Owner prior to beginning work. Provide barriers and signage as necessary to direct building users and visitors toward the appropriate entrance and egress routes. Provide proper protection from falling objects over entrances and walkways that are to be kept open during working hours.

3.02 DEMOLITION

- A. Demolition work shall proceed in an orderly manner and shall be coordinated with other trades directly and indirectly affected by the work. Notify the Architect / Owner immediately of any conditions affecting the historic materials or the appearance of the building, where different from the conditions shown on the Drawings.
- B. The Contractor shall demolish only those elements shown on the Drawings. Removal of additional materials must be approved by the Architect and Owner prior to beginning the work. Repair and/or reconstruction of elements demolished by mistake shall be the responsibility of the Contractor.
- C. The Contractor shall remove trash and demolition debris from the building daily, to a dumpster located elsewhere on the site. Dumpsters shall be emptied on a timely basis as the work progresses. Do not overfill site dumpsters.
- D. Debris shall be carried down from upper floors or deposited in chutes located above the dumpsters. No debris is to be dropped or thrown from any height.

3.03 FIRE PROTECTION

- A. Maintain adequate access and egress to and from work areas as required by local fire department regulations. Do not allow debris to block emergency access and egress routes.
- B. The Contractor shall maintain fire extinguishers of the appropriate size and class in all work areas. All personnel shall be trained in their use.
- C. No burning of debris or waste materials will be permitted on site.

END OF SECTION

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SECTION 02 2250

MINOR DEMOLITION FOR REMODELING

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GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Removal of designated construction
 - 2. Dismantling, cutting and alterations as indicated and necessary for the completion of the Work.
 - 3. Disposal of materials.
 - 4. Storage of removed materials.
 - 5. Identification of utilities.
 - 6. Salvaged items.
 - 7. Protection of items to remain as indicated.

1.02 SUBMITTALS

- A. Section 01 3300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of temporary work.

1.03 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

1.04 SEQUENCING

- A. Section 01100 - Summary: Work sequence.
- B. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.05 SCHEDULING

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Schedule Work to coincide with new construction.
- C. Describe demolition removal procedures and schedule.
- D. Coordinate utility and building service interruptions with Owner.

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1. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
2. Schedule tie-ins to existing systems to minimize disruption.
3. Coordinate Work to ensure fire sprinklers, audio/visual fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in publicly occupied areas.

1.06 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PRODUCTS

2.01 Not Used

EXECUTION

3.01 PREPARATION

- A. Refer to Division 1 sections for additional information.
- B. Provide, erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, Owner, Contractor's employees, and existing improvements to remain.
- C. Erect and maintain weatherproof closures for exterior openings.
- D. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.
- E. Protect existing materials and existing improvements which are not to be demolished.
- F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.
- G. Notify affected utility companies before starting work and comply with their requirements.
- H. Mark location and termination of utilities.
- I. Provide appropriate temporary signage including signage for exit or building egress.

3.02 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.
- B. Tag components and equipment Owner designates for salvage.

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- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Carefully remove building components and equipment indicated to be salvaged.

3.03 DEMOLITION

- A. Conduct demolition to minimize interference with adjacent structures and building areas.
- B. Conduct operations with minimum interference to public or private accesses.
- C. Maintain protected egress from and access to adjacent existing buildings at all times.
- D. Do not close or obstruct roadways or sidewalks without permits.
- E. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.
- F. Disconnect and remove designated utilities within demolition areas. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.
- G. Demolish in an orderly and careful manner. Protect existing improvements, and supporting structural members.
- H. Carefully remove building components indicated to be reused.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.
- I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition. Remove temporary Work

END OF SECTION

SECTION 02 2700

TEMPORARY SOIL EROSION AND SEDIMENT CONTROL MEASURES

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PART 1 GENERAL

1.01 DESCRIPTION

- A. General: Provide temporary soil and sediment control measures in accordance with the Plans and Contract Documents.

1.02 QUALITY ASSURANCE

A. Standards

1. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

B. Design Criteria

1. The primary objective of this specification is to control soil erosion to the maximum extent practicable and to comply with the approved sediment and stormwater plan for the site construction.
2. The temporary control provisions contained herein shall be coordinated with permanent erosion control features to the extent practical to assure effective and continuous erosion control throughout the construction.
3. The erosion control measures described herein shall be continued until the construction is complete and all disturbed areas are fully stabilized.
4. Wherever construction exposes work which is subject to erosion, erosion control features or other work to be completed within such areas shall follow as soon after exposure as practicable.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Temporary mulches shall conform to Section 735 of the Delaware Department of Transportation Standard Specifications for Bridges and Highways.
- B. Temporary grass mixtures shall be as shown on the Plans and shall conform with the Section 734 of the Standard Specifications.
- C. Fertilizer and soil conditioners shall be a standard commercial grade.
- D. Temporary structural Erosion Control measures shall conform to the requirements of the Delaware Erosion and Sediment Control Handbook.
- E. Riprap: The stones shall be of durable rock, sized and graded so that at least fifty percent (50%) of the pieces are larger than the d50 size shown on the Plans. The diameter of the largest stone shall not exceed 1.5 times the d50 size, nor shall the smallest stone be smaller than one-half the d50 size. All stone shall meet the requirements of Section 712 of the Delaware Department of

Transportation Standard Specifications. Filter cloth shall be a non-woven geotextile conforming to ASTM D-1777 or ASTM D-1682.

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PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. Vegetative stabilization shall be used on graded or cleared areas which are subject to erosion for a period of 14 days or more.
- B. All temporary erosion control measures shall be installed in accordance with the Delaware Erosion and Sediment Control Handbook.
- C. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal or state agencies, the more restrictive laws, rules, or regulations shall apply.
- D. The Contractor shall be responsible for maintaining all soil erosion and sediment control measures in an acceptable and functional manner. All temporary measures shall be removed by the Contractor after all other construction is complete, final restorations installed, and all disturbed areas have been adequately stabilized.

END OF SECTION

SECTION 02 4860

FERTILIZING AND SEEDING

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PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide lime, fertilizer and permanent seed mixture in the areas shown on the plans for:
 - 1. Restoration of existing grass areas disturbed by Contractor's operations.
 - 2. Stabilization of unpaved areas.

1.02 1.2 STANDARDS

- A. The quality of materials and performance of work specified in this section shall be in
 - 1. accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2001 (hereinafter referred to as the "Standard Specifications").
 - a. Section 733: Topsoiling
 - b. Section 734: Seeding

1.03 SUBMITTALS

- A. Certificates
 - 1. Seed producer's certified analysis of composition, purity, and germination of seed mixture, dated within nine (9) months of sowing.
 - 2. Manufacturer's certified chemical and physical composition analysis for ground limestone.
- B. Delivery Slips
 - 1. Accompany each delivery of seed, ground limestone, and fertilizer with delivery slip showing the product weight.
- C. Test Reports
 - 1. Submit results of test report for pH analysis of soil, and when ground limestone is required, the total amount of magnesium and calcium oxides required.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in accordance with manufacturer's printed instructions, and in such manner as to protect from moisture.
- B. Store and handle material in accordance with manufacturer's printed instructions, and in such manner as to protect from moisture.

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1.05 JOB CONDITIONS

- A. Existing Conditions: Perform seeding only after preceding work affecting ground surface is completed.
- B. Environmental Requirements
 - 1. Plant seed on unfrozen soil. Soil shall be in friable condition at the time of seeding.
 - 2. Do not perform seeding when wind exceeds 15 mph.
 - 3. Do not seed between October 15th and March 1st.
- C. Protection: Restrict pedestrian and vehicular traffic from seeded areas after planting to
 - 1. end of the establishment period.

PART 2 PRODUCTS

2.01 SEED MIXTURE

- A. Seed mixture shall be as shown on the Plan or, if not provided, as specified in Delaware Department of Transportation Standard Specification Section 734.04: Permanent Seeding-Subdivisions
- B. Use clean, dry, new crop seed. Use certified seed when available.

2.02 TOPSOIL

- A. Topsoil shall conform to Section 733 of the Standard Specifications and Section 02200 of these Specifications.

2.03 GROUND LIMESTONE

- A. Limestone shall be ground agricultural limestone conforming to Section 734 of the Standard Specifications.

2.04 FERTILIZER

- A. Fertilizer shall conform to Section 734 of the Standard Specifications for Suburban Development.

2.05 MULCH

- A. Mulch shall conform to Section 735 of the Standard Specifications and Section 02489 of these Specifications.

PART 3 EXECUTION

3.01 PREPARATION

- A. Check that clearing, soil preparation and preceding work affecting ground surface is completed.

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- B. Verify that soil is unfrozen and within allowable moisture content.
- C. Do not start until conditions are satisfactory.
- D. When soil to be seeded has a pH value of less than 5.8, evenly spread ground limestone, which is dry and free flowing, over area to be seeded at rate that will change soil pH value to 6.5. Thoroughly mix limestone into upper 3 to 4 inches of soil by discing, harrowing, or other approved method.
- E. Within limits set forth under materials, select fertilizer for use on the project. Use one selection throughout project. Apply fertilizer in quantity necessary to yield 60 pounds of nitrogen per acre. Thoroughly mix fertilizer into upper 3 to 4 inches of soil by discing, harrowing, or other approved method.
- F. Water dry soil at least 24 hours prior to seeding to obtain a loose friable seed bed.
- G. Before applying seed, remove all stones, rocks, lumps, roots, wires, clods, and other objects measuring one-half inch or larger in any dimension.

3.02 APPLICATION

- A. Broadcast half of seed with mechanical seeder.
- B. Broadcast remaining half of seed at right angles to first seeding pattern, using same broadcast method.
- C. Apply seed at the rate specified in the Standard Specifications.
- D. Cover seed to depth of 1/8 inch by raking or other approved method.
- E. Roll seeded area with roller weighing maximum of 150 pounds per foot of width.
- F. Water seeded area until water penetrates to a depth of 3 to 4 inches.

3.03 PROTECTION

- A. Erect temporary signs and barriers to protect seeded areas from pedestrian and vehicular traffic.

3.04 LAWN ESTABLISHMENT

- A. Watering
 - 1. Keep soil moist during seed germination period.
 - 2. Method of watering shall provide equal distribution and coverage to all areas seeded.
- B. Re-lime, re-fertilize, and reseed all seeded areas which become eroded or otherwise disturbed; or which require mowing of weedy areas in order to establish acceptable turf.
- C. Re-lime, re-fertilize, and reseed spots larger than one square foot not having uniform stand of grass practically weed free, and not containing plants in reasonable proportion to the various kinds of seed in the grass seed mixture.

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- D. Perform all lawn establishment work in accordance with the specifications without additional compensation.
- E. Establishment period to extend until acceptance of the project.

3.05 CLEANING

- A. Immediately clean spills on paved and finished surface areas.
- B. Remove debris and excess materials from project site.
- C. Dispose of protective barricades and warning signs at termination of lawn establishment period.

3.06 FIELD QUALITY CONTROL

- A. Seed Mixture
 - 1. Contractor shall pay for testing and related costs when materials are found not to be in compliance with this specification.
 - 2. Sampling and testing shall be conducted in accordance with Delaware Code and with the rules and regulations for testing seed adopted by the Association of Official Seed Analysis.

END OF SECTION

SECTION 02 4890

MULCHING

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PART 1 GENERAL

1.01 DESCRIPTION

- A. Furnish, place, and anchor mulch over seeded areas, on slopes, and on others areas as indicated on the Plans.

1.02 STANDARDS

- A. The quality of materials and performance of work specified in this section shall be in accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2001 (hereinafter referred to as the "Standard Specifications").
- B. Section 735: Mulching
- C. Reference the Delaware Erosion and Sediment Control Handbook for Development (2003).

1.03 SUBMITTALS

- A. Manufacturer's Literature and Recommendations
 - 1. Submit manufacturer's descriptive and printed application instructions for synthetic plastic emulsion, fiber mulch and liquid binders.
- B. Certificates
 - 1. Provide certificates, signed by the material supplier or producer, stating that mulch and binder material when specified, complies with specification requirements.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all erosion control binder materials in manufacturer's original packaging with all tags and labels intact and legible.
- B. Store and handle binder materials in accordance with manufacturer's instructions.

1.05 JOB CONDITIONS

- A. Existing Conditions: Perform mulching only after preceding related work is accepted.
- B. Environmental Requirements
 - 1. Do not apply synthetic plastic emulsion binder or chemical binders during rain or freezing weather.
- C. Restrict pedestrian and vehicular traffic from mulched areas until end of maintenance
 - 1. period.

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PART 2 PRODUCTS

2.01 MULCH

- A. Add weed barrier fabric over soil at all mulch beds.
- B. Mulch shall be small grain straw or wood cellulose fiber and shall be in accordance with Section 735 of the Standard Specifications.
- C. Erosion control netting, jute mesh, excelsior blankets, and reinforcing mats shall be in accordance with Section 735 of the Standard Specifications.

2.02 LIQUID MULCH BINDER MATERIALS

- A. Chemical binders, if used and where approved by the Engineer, shall conform to Section 735 of the Standard Specifications.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that seeding and all other work affecting ground surface has been completed.

3.02 PREPARATION

- A. Immediately before mulching, re-lime, re-fertilize, and reseed areas which have become eroded or disturbed as specified in Section 02 4860 of these Specifications.

3.03 INSTALLATION

- A. General
 - 1. Apply straw or cellulose mulch to seeded areas within seven (7) days of seed application.
 - 2. Secure straw mulch immediately after placing. Use mulch netting, or secure by crimping or tilling. Use of chemical binders must be approved by the Engineer prior to use.
 - 3. Install erosion control mulching blanket immediately after seed application, where designated on the plans.
 - 4. Leave all mulch in place and allow to disintegrate, except remove excessive amounts of straw mulch as directed.
- B. Straw Mulch
 - 1. Quantity of straw mulch shall conform with Section 735 of the Standard
 - a. Specifications.
- C. Binder Straw Mulch
 - 1. Evenly distribute binder over mulch.
 - 2. Quantity of mulch binder shall conform with Section 735 of the Standard Specifications and the Delaware Erosion and Sediment Control Handbook.

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- D. Mulch Anchoring
 - 1. Mulch crimping or tilling shall be accomplished in accordance with the standards established in Section 735 of the Standard Specifications.
 - 2. Mulch netting and blankets shall be shall be securely stapled and anchored in accordance with the manufacturer's written instructions.
- E. Erosion control fabric shall be installed in accordance with the manufacturer's written instructions and per Section 735 of the Standard Specifications.
 - 1. instructions and per Section 735 of the Standard Specifications.
- F. The quantity of wood cellulose mulch shall be in accordance to Section 735 of the
 - 1. Standard Specifications.

3.04 MULCH MAINTENANCE

- A. Re-mulch all areas requiring reseeding.
- B. Re-lime, re-fertilize, reseed, and re-mulch all areas where straw mulch is displaced.
- C. In areas where an erosion control blanket becomes loose, torn, undermined, or displaced, or where staples have become loosened or raised, make repairs as required. Repairs shall include re-liming, re-fertilizing, and reseeding.
- D. Perform all mulch maintenance work in accordance with the specifications without additional compensation.
- E. Mulch maintenance period to extend until acceptance of project.

3.05 CLEANING

- A. In addition to cleaning required elsewhere in these specifications:
 - 1. Immediately clean spills from paved and finished surface areas.
 - 2. Remove debris and excess materials from project site.

END OF SECTION

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SECTION 02 5100

CONCRETE SIDEWALKS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide new concrete sidewalk in areas designated on Plans, marked in the field, or as directed by the Engineer.
- B. Place Graded Aggregate Base Course below proposed concrete sidewalks.

1.02 STANDARDS

- A. The quality of materials and performance of work specified in this section shall be in accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2001 (hereinafter referred to as the "Standard Specifications").
 - 1. Section 302: Graded Aggregate Base Course
 - 2. Section 705: Portland Cement Concrete
 - 3. Section 762: Saw Cutting
 - 4. Section 812: Portland Cement Concrete
- B. Comply with the requirements of the City of Wilmington Department of Public Works.

1.03 SUBMITTALS

- A. Provide for approval the source of supply for all concrete deliveries. The source of supply shall be an accepted DELDOT supplier.
- B. Certificates: All deliveries of concrete shall be accompanied by delivery slips.
- C. For integrally colored concrete, submit product data for color additives and curing products. Submit the manufacturer's color chart for the Landscape Architect to select the concrete colors.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Allowable Concrete Temperatures
 - 1. Cold weather: 60 degrees Fahrenheit. (18° C) when discharged from the mixer.
 - 2. Hot weather: Maximum concrete temperature is 80 degrees Fahrenheit. (30° C).
- B. Do not place concrete during rain, when atmospheric temperature is at or below 36 degrees Fahrenheit. (2° C), or when conditions are otherwise unfavorable.

1.05 PROTECTION

- A. Protect concrete from pedestrian and vehicular traffic until concrete has been sufficiently cured.

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- B. Replace any concrete damaged by vandalism.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Concrete:
 - 1. Use concrete developing a compressive strength of 3,000 p.s.i. at twenty-eight (28) days.
 - 2. Use air-entrained concrete.
- B. Cement aggregates, water and air-entrainment methods and materials conforming to Section 812 of the Standard Specifications.
- C. Joint filler: Pre-formed expansion joint material, conforming to Section 808.06 of the Standard Specifications.
- D. Curing compound: White pigmented liquid, conforming to AASHTO M 148 for Type 2, Class A or B.
- E. Vapor barrier: Where called for on Plans shall be 6 mil. polyethylene.

2.02 COLOR ADDITIVES

- A. Color additives shall be concentrated pigments specially processed for mixing into concrete. Pigments shall comply with ASTM C979, and shall be color sable, nonfading, and resistant to lime and other alkalis.
- B. Color additives shall be of one manufacturer, and shall be as produced by Davis Colors, Solomon Colors, or approved equal. Colors to be selected by Landscape Architect from manufacturer's available colors.

PART 3 EXECUTION

3.01 PREPARATION FOR NEW SIDEWALK

- A. Excavate subgrade and set forms so that finished sidewalk conforms to lines and grades shown on Plans.
- B. Prepare sidewalk subgrade as specified in Section 705 of the Standard Specifications.
- C. Verify that earthwork is completed to correct line and grade.
- D. Verify that the forms conform to line, grade and dimensions shown on Plans.
- E. Check that the subgrade is smooth, compacted and free of excessive moisture.
- F. Do not commence work until conditions are satisfactory.
- G. Concrete sidewalks and aprons shall be constructed in accordance with the requirements of Section 705 of the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction.

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- H. The foundation shall be formed at the required grade to accommodate the elevations, dimensions, and details shown on the Plans for the bottom of the sidewalk. All soft and yielding or otherwise unsuitable materials shall be removed and replaced with graded aggregate.
- I. Concrete shall be cured for a minimum of five days. The sidewalk shall not be opened to pedestrian and vehicular traffic until the end of the curing period.
- J. Expansion joints shall extend from the surface to the foundation and shall be at right angles to the sidewalk surface. An expansion joint shall be placed across the sidewalk as denoted on the Plans, or at approximately 20 foot intervals. Expansion material shall also be placed next to curbs, pavements, and fixed civil structures, and around all appurtenances, such as manholes, utility boxes, and poles that extend into and through the sidewalk.

END OF SECTION

SECTION 03 0505

UNDERSLAB VAPOR BARRIER

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet vapor barrier under concrete slabs on grade.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

1.03 REFERENCE STANDARDS

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011.
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Underslab Vapor Barrier:
 - 1. Water Vapor Permeance: Not more than 0.010 perms (0.6 ng/(s m² Pa)), maximum.
 - 2. Complying with ASTM E1745 Class A.
 - 3. Thickness: 15 mils (.266 mm).
 - 4. Basis of Design:
 - a. Stego Industries LLC; Stego Wrap Vapor Barrier: www.stegoindustries.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

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PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

3.02 INSTALLATION

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade; lap sheet over footings and up walls and piers a minimum of 6 inches and seal to foundation walls.
- C. Lap joints minimum 6 inches (150 mm).
- D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
- F. Install a vapor barrier under all concrete slabs in habitable space.
- G. Repair damaged vapor retarder before covering with other materials.

END OF SECTION

SECTION 03 2000

CONCRETE REINFORCING

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 04 2000 - Unit Masonry: Reinforcement for masonry.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcement Accessories:

2.02 FABRICATION

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SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

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

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

1.03 INFORMATIONAL SUBMITTALS

- A. Material certificates.
- B. Material test reports.
- C. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1.05 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.06 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1.

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1. Do not use calcium chloride, salt, or other materials containing air-entraining agents or chemical accelerators unless otherwise specified and approved in mixture designs.

- B. Hot-Weather Placement: Comply with ACI 301.

PART 2 PRODUCTS

2.01 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 1. ACI 301
 2. ACI 117

2.02 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.03 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.04 CONCRETE MATERIALS

- A. Cementitious Materials:
 1. Portland Cement: ASTM C 150, Type I.
- B. Normal-Weight Aggregates: ASTM C 33, graded.
 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C 260.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 1. Water-Reducing Admixture: ASTM C 494, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

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5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

E. Water: ASTM C 94 and potable.

2.05 WATERSTOPS

- A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

2.06 VAPOR RETARDERS

- A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

2.07 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

2.08 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.09 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Normal-Weight Concrete:
1. Minimum Compressive Strength: As indicated at 28 days.
 2. Maximum W/C Ratio: As indicated.
 3. Slump Limit: As indicated
 4. Air Content: As indicated.
 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

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2.12 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer exterior corners and edges of permanently exposed concrete.

3.02 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.03 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.04 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.05 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

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- B. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint/filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.06 WATERSTOP INSTALLATION

- A. Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions.

3.07 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3.08 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.09 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to all interior horizontal surfaces.
- C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

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1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.12 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION

SECTION 03 3001

CONCRETE REPAIR

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PART 1 - GENERAL

- 1.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:
- A. Building #16
 - 1. Remove and repair broken step at entry porch.
 - 2. Remove failing concrete at rear entry stair, patch and repair concrete.
 - 3. Repair concrete at North Elevation basement areaway.
 - B. Building #18:
 - 1. Reserved
 - C. Building #20:
 - 1. Reserved
 - D. Building #22
 - 1. Reserved
 - E. Building #24
 - 1. Repair concrete apron around areaway.
 - F. Building #26
 - 1. Remove and replace concrete apron around areaway, with replacement of metal access door.
 - 2. Reinforce brick areaway with concrete and masonry, during removal and re-installation of metal coal chute hatch.
 - G. Storage Shed
 - 1. Install new poured-in-place, reinforced, concrete ramp.
- 1.02 RELATED SECTIONS:
- A. Section 07900 - Metal Flashing & Sealants
 - B. Section 09900 - Paint and Finishes
- 1.03 SUBMITTALS
- A. Product Data: Submit manufacturer's product data for proprietary materials, including cementitious materials.
 - B. Samples: Submit one-pound sample of aggregate.

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1.04 QUALITY ASSURANCE

- A. Conform to applicable provisions of the following reference standards.
1. ASTM C33 - Concrete Aggregates
 2. ASTM C150 - Portland Cement

1.05 PROJECT CONDITIONS

- A. Protect surrounding materials and portions of the building from soiling and spattering during concrete repair operations. Contractor shall clean soiled surfaces using a method approved by the Architect to the satisfaction of and at no additional cost to the Owner.
- B. In compliance with fire regulations, the basement exists of the building should remain active at all times. The Contractor shall provide alternative stairs and ramps, if required to route pedestrian traffic around the work areas. The Contractor shall consult with the Owner for approval of an access plan, prior to beginning construction operations, indicating the proposed routes of access and egress during the course of the project.

PART 2 - PRODUCTS

2.01 CONCRETE PATCHING MATERIALS:

- A. Portland Cement: ASTM C150, Type I. Gray and white Portland cements may be mixed to obtain a suitable color match to the existing concrete.
- B. Sand: Clean, well-graded, yellow-brown sand conforming to ASTM C144, free of silt, clay, soluble salts and organic matter.
- C. Aggregate: 3/8" size blue-gray crushed trap rock stone to match the aggregate exposed in the adjacent early 20th century concrete.
- D. Epoxy Bonding Agent: Armatec 110, as manufactured by Sika Corporation, Lyndhurst, NJ or approved equal.
- E. The mortar mix for patches greater than 2" in depth shall consist of 1 part Portland cement by volume, 2 parts sand aggregate and 1 part trap rock aggregate.
- F. The mortar mix for patches less than 2" deep shall consist of 1 part Portland cement by volume and three parts sand aggregate.

PART 3 - EXECUTION

3.01 CONCRETE CLEANING:

- A. The areaway walls and surfaces wall shall be cleaned using a medium pressure water wash prior to proceeding with concrete patching. Prior to cleaning, confirm that adequate drainage is available from locations where water will accumulate, notifying Owner.

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- B. Protect all electrical fixtures and appurtenances with water proof covering or enclosure during cleaning operations. Protect windows and doors with polyethylene sheeting. Provide collection area or drainage trough for cleaning water runoff. The use of wet vacuums to remove effluent may also be acceptable.
- C. Water pressure shall not exceed 300 psi at the nozzle.
- D. Water cleaning shall be executed starting at the top of the wall and working downward.
- E. No detergents or chemical additives are to be mixed with the cleaning water.
- F. Hand scrubbing shall be employed for removal of stubborn spots and stains.

3.02 CONCRETE PATCHING:

- A. Remove surface dirt by scrubbing damaged areas with a bristle brush and clean water. Allow to dry. No acidic or alkaline cleaning agents will be permitted.
- B. Remove all loose concrete, corrosion products and debris using a wire brush. Exposed reinforcement shall be wire brushed back to sound metal and painted with a zinc-rich epoxy paint as specified in Section 09900 for exterior ferrous metal.
- C. Concrete shall be chipped back at least 3/8" behind exposed sound reinforcement to provide a key for the patch. Minimum depth of patches shall be 1". Edges shall be slightly undercut to secure the patch.
- D. Apply epoxy bonding agent according to the manufacturer's instructions prior to the placement of the concrete patch. Do not allow to cure before the patching mortar is placed.
- E. Patching mortar shall be placed in layers not to exceed 1/2" thick. Scarify each layer, protect with plastic and allow to set but not cure. Re-wet thoroughly prior to placement of subsequent layers. Finish surface with steel trowel. Protect with plastic sheeting until cured.

END OF SECTION

SECTION 03 3005

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WATER VAPOR REDUCING ADMIXTURE FOR CAST-IN-PLACE CONCRETE

PART 2 PRODUCTS

1.01 WATER VAPOR REDUCING ADMIXTURE

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Water Vapor Reducing Admixture (WVRA): ASTM C494/C494M, Type S; liquid, inorganic admixture free of volatile organic compounds (VOCs); formulated to react with cementitious material to integrally and permanently close capillary systems formed during curing.
 - 1. Capillary Break: Calcium silicate hydrate.
 - 2. Water Vapor Permeance: 0.03 perms (1.72 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
 - 3. Hydraulic Conductivity: 3.28×10^{-8} feet per second (1×10^{-8} cm/s), maximum, when tested according to ASTM D5084.
 - 4. Toxicity: None.
 - 5. Solvent: Water.
 - 6. Hazardous Vapors: None.
 - 7. Products:
 - a. Specialty Products Group; Vapor Lock 20/20: www.spggogreen.com/#sle.

END OF SECTION

SECTION 04 0120

BRICK MASONRY REPOINTING

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DESCRIPTION:

- 1.01 The work shall consist of removing existing mortar from joints and exposed surfaces of brick and repointing joints in the brick masonry. All exterior brick with displaced mortar or cracks in the joints shall be repointed.
- 1.02 Replacement of any missing or damaged bricks is also included with the work.

MATERIALS:

- 2.01 Repointing mortar shall conform to ASTM C270 and consist of ASTM Type N (750 psi).
- 2.02 Portland cement shall conform to ASTM C150, white, non-staining. Portland cement shall have not more than 0.60% alkali. All Portland cement used shall be supplied by the same manufacturer.
- 2.03 Hydrated lime shall meet the requirements of ASTM C 207, Type SA. All hydrated lime used shall be supplied by the same manufacturer.
- 2.04 Masonry sand shall be obtained from a natural local source, and graded per ASTM C144. The sand shall be free of impurities such as salts, organic impurities, and other deleterious materials in accordance with ASTM C 144.
- 2.05 Water used for mixing and curing mortar shall be of reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the final product, of potable quality, and free of silt, mud, grass or other foreign.
- 2.06 New mortar and brick shall match or replicate the existing masonry as closely as possible in kind, sizes, quality, color, texture, and finish. All brick shall be clean and free from structural defects.

EXECUTION:

- 3.01 Cleaning and repointing work shall be performed by skilled masons.
- 3.02 For areas to be repointed, all existing pointing mortar shall be removed to a minimum uniform depth of 2 inches or 2.5 times the joint width, whichever is greater. Any loose or disintegrated mortar beyond this minimum depth shall also be removed. Removal of mortar from joints shall be accomplished using hand tools and small pneumatically-powered chisels, and small electric grinders. If electric grinders are utilized for cleaning vertical joints, special care shall be used at ends of the joints to prevent damage to adjacent brick.
- 3.03 The face of the brick shall be cleaned to remove existing mortar smears and plastered over

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- areas, exposing the natural stone faces. The mortar removal shall be accomplished using hand tools and small pneumatically-powered chisels.
- 3.04 After cleaning and removal work is complete, the joints shall be rinsed with water and brushed out to remove any loose particles and dust. The rinsing action should not scour additional bedding mortar material out of the joint.
- 3.05 Missing or damaged brick shall be replaced with new brick. Competent loose brick shall be carefully removed, cleaned, and reset in their original position. Bedding mortar for setting brick shall be proportioned and mixed as specified for pointing mortar.
- 3.06 Pointing mortar dry ingredients shall be measured by volume and thoroughly mixed prior to the addition of any water. Add sufficient water to the dry ingredients to produce a mortar that retains its form when hand- squeezed and released. Mix for approximately 5 minutes. Allow this mortar to stand covered for not less than 1 hour nor more than 1 ½ hours for prehydration. Add additional water in small portions until a stiff, but workable consistency is reached. The use of pigments or other mortar additives will not be permitted. Mortar shall be used within 30 minutes of final mixing. Retempering of mortar will not be permitted.
- 3.07 Pointing shall not be done when the ambient temperature is 40° F or below, nor when the brick contains frost. At the time of pointing, the joints shall be damp, but with no standing water present. All pointing mortar shall be placed by hand. Where the existing mortar has been removed to a depth greater than 2 inches, these deeper areas shall be filled first, compacting mortar to fill all voids. Once a uniform joint depth is attained, the joint shall be filled by applying several layers of mortar, packing it well into the back corners. The thickness of the individual layers shall not exceed 1/2 inch and each successive layer of mortar shall be permitted to reach thumb-print hardness before application of the next layer. The final layer of mortar shall be recessed slightly behind the face of the brick, and finished with an approved flat pointing tool. Feathered edges should be avoided. After the mortar has dried, but before it is initially set (1 to 2 hours), excess mortar shall be removed from the edge of the joint by brushing with a natural bristle or nylon brush.
- 3.08 Repointed surfaces shall be kept moist by water-misting at least three times a day, and protected from extreme heat, freezing, high winds, and direct sunlight for a seventy-two hour period after finishing. Repointed areas shall be protected from rain for at least 12 hours after finishing.
- 3.09 At the completion of the project, masonry surfaces shall be cleaned using plain water and natural bristle or nylon brushes as directed by the Architect. Use of chemical detergents will not be permitted for cleaning masonry.

END OF SECTION

SECTION 04 0511

MASONRY MORTARING AND GROUTING

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mortar for masonry.
- B. Grout for masonry and other grouted components.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Reports: Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C 270 and test and evaluation reports per ASTM C 780.
- E. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C 1019.

1.03 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.05 FIELD CONDITIONS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

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PART 2 PRODUCTS

2.01 MORTAR AND GROUT APPLICATIONS

- A. Use only factory premixed packaged dry materials for mortar and grout, with addition of water only at project site.
 - 1. Exception: If a specified mix design is not available in a premixed dry package, provide equivalent mix design using standard non-premixed materials.
- B. Mortar Color: Natural gray unless otherwise indicated.
- C. Mortar Mix Designs: ASTM C270, Property Specification.
 - 1. Masonry below grade and in contact with earth: Type S.
 - 2. Exterior Masonry Veneer: Type N.

2.02 MATERIALS

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Type: Type S.
 - 2. Color: Standard gray.
 - 3. Water repellant mortar for use with water repellant masonry units.
 - 4. Products:
 - a. Glen-Gery; Color Mortar Blend.
 - b. Lafarge; Eaglebond.
 - c. Holcim (US) Inc; Centurion Colorbond PL.
 - d. Lehigh Portland Cement Co; Lehigh Custom Color Portland/ Lime.
 - e. Substitutions: In accordance with the Contract Documents..
- B. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
- C. Water: Clean and potable.
- D. Accelerating Admixture: Nonchloride type for use in cold weather.
- E. Integral Water Repellent Admixture: Polymeric liquid admixture added to mortar and grout at the time of manufacture.
 - 1. Performance of Mortar and Grout with Integral Water Repellent:
 - a. Water Permeance: When tested per ASTM E514/E514M and for a minimum of 72 hours:
 - 1) No water visible on back of wall above flashing at the end of 24 hours.
 - 2) No flow of water from flashing equal to or greater than 0.032 gallons per hour (0.05 L per hour) at the end of 24 hours.
 - 3) No more than 25% of wall area above flashing visibly damp at end of test.
 - b. Compressive Strength: ASTM C1314; maximum 5% decrease.
 - c. Drying Shrinkage: ASTM C1148; maximum 5% increase in shrinkage.

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2. Use only in combination with masonry units produced with integral water-repellent admixture.
3. Manufacturers:
 - a. ACM Chemistries.
 - b. BASF Corporation- Construction Systems.
 - c. Grace Construction Products.

2.03 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.
- D. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- E. Do not use anti-freeze compounds to lower the freezing point of mortar.
- F. If water is lost by evaporation, re-temper only within two hours of mixing.

2.04 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
- C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install mortar and grout to requirements of section(s) in which masonry is specified.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 16 inches (400 mm) without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

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3.02 GROUTING

- A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of contract documents.
- B. Low-Lift Grouting:
 - 1. Limit height of pours to 12 inches (300 mm).
 - 2. Limit height of masonry to 16 inches (400 mm) above each pour.
 - 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
 - 4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
- C. High-Lift Grouting:
 - 1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
 - 2. Place grout for spanning elements in single, continuous pour.

END OF SECTION

SECTION 04 2000

UNIT MASONRY

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mortar and Grout.
- B. Reinforcement and Anchorage.
- C. Brick Repointing

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.

1.03 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- B. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- D. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2013.
- E. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2014.
- F. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- G. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- I. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- J. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.
- K. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2016.
- L. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- M. UL (FRD) - Fire Resistance Directory; current edition.

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1.04 SUBMITTALS

- A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- B. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.
- C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Fire Rated Assemblies: Conform to applicable code for Building Code requirements for fire rated masonry construction.

1.06 Qualifications

- A. Installer: Company specializing in performing Work of this section with minimum three years documented experience

1.07 Preinstallation Meeting

- A. Convene minimum one week prior to commencing Work of this section.

1.08 Delivery, Storage, and Handling

- A. Accept units on site. Inspect for damage.

1.09 Environmental Requirements

- A. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- B. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

1.10 Coordination

- A. Coordinate the masonry work with installation of window and door anchors.

PART 2 PRODUCTS

2.01 BRICK UNITS

- A. Facing Brick : ASTM C144

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1. Nominal size: Shall match existing or replicate the existing masonry as closely as possible in kind, sizes, quality, color, texture, and finish. All brick shall be clean and free from structural defects. .
2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

B. Building (Common) Brick: ASTM C62, Grade SW; solid units.

1. Nominal size: Shall match existing or replicate the existing masonry as closely as possible in kind, sizes, quality, color, texture, and finish. All brick shall be clean and free from structural defects. .

2.02 MORTAR AND GROUT MATERIALS

A. Grout Aggregate: ASTM C404.

B. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.

1. Type: SA.
2. Color: Match Existing.

C. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type N mortar in accordance with ASTM C270 with the addition of water only.

1. Color: Color shall match existing..
2. Portland cement shall conform to ASTM C150, white, non-staining. Portland cement shall have not more than 0.60% alkali. All Portland cement used shall be supplied by the same manufacturer.

D. Water

1. Water used for mixing and curing mortar shall be of reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the final product, of potable quality, and free of silt, mud, grass or other foreign.

E. Sand

1. Masonry sand shall be obtained from a natural local source, and graded per ASTM C144. The sand shall be free of impurities such as salts, organic impurities, and other deleterious materials in accordance with ASTM C 144.

2.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:

1. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.
2. WIRE-BOND: www.wirebond.com/#sle.
3. Heckmann Building Products.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; galvanized finish.

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- C. Single Wythe Joint Reinforcement: Ladder type; ASTM A1054/A1064M steel wire, mild galvanized to ASTM A641/A641M, Class 3; 0.1875 inch (4.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
- D. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face.

PART 3 EXECUTION

3.01 INSTALLERS

- A. Cleaning and repointing work shall be performed by skilled masons.

3.02 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.03 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.04 COLD AND HOT WEATHER REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

3.05 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
 - 3. Mortar Joints: Concave.

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3.06 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners, except for units laid in stack bond.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- J. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- K. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.07 REPOINTING AND REPLACING DAMAGED BRICK

- A. For areas to be repointed, all existing pointing mortar shall be removed to a minimum uniform depth of 2 inches or 2.5 times the joint width, whichever is greater. Any loose or disintegrated mortar beyond this minimum depth shall also be removed. Removal of mortar from joints shall be accomplished using hand tools and small pneumatically-powered chisels, and small electric grinders. If electric grinders are utilized for cleaning vertical joints, special care shall be used at ends of the joints to prevent damage to adjacent brick.
- B. The face of the brick shall be cleaned to remove existing mortar smears and plastered over areas, exposing the natural stone faces. The mortar removal shall be accomplished using hand tools and small pneumatically-powered chisels.
- C. After cleaning and removal work is complete, the joints shall be rinsed with water and brushed out to remove any loose particles and dust. The rinsing action should not scour additional bedding mortar material out of the joint.
- D. Missing or damaged brick shall be replaced with new brick. Competent loose brick shall be carefully removed, cleaned, and reset in their original position. Bedding mortar for setting brick shall be proportioned and mixed as specified for pointing mortar.
- E. Pointing mortar dry ingredients shall be measured by volume and thoroughly mixed prior to the addition of any water. Add sufficient water to the dry ingredients to produce a mortar that

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retains its form when hand-squeezed and released. Mix for approximately 5 minutes. Allow this mortar to stand covered for not less than 1 hour nor more than 1 1/2 hours for prehydration. Add additional water in small portions until a stiff, but workable consistency is reached. The use of pigments or other mortar additives will not be permitted. Mortar shall be used within 30 minutes of final mixing. Retempering of mortar will not be permitted.

- F. Pointing shall not be done when the ambient temperature is 40° F or below, nor when the brick contains frost. At the time of pointing, the joints shall be damp, but with no standing water present. All pointing mortar shall be placed by hand. Where the existing mortar has been removed to a depth greater than 2 inches, these deeper areas shall be filled first, compacting mortar to fill all voids. Once a uniform joint depth is attained, the joint shall be filled by applying several layers of mortar, packing it well into the back corners. The thickness of the individual layers shall not exceed 1/2 inch and each successive layer of mortar shall be permitted to reach thumb-print hardness before application of the next layer. The final layer of mortar shall be recessed slightly behind the face of the brick, and finished with an approved flat pointing tool. Feathered edges should be avoided. After the mortar has dried, but before it is initially set (1 to 2 hours), excess mortar shall be removed from the edge of the joint by brushing with a natural bristle or nylon brush.
- G. Repointed surfaces shall be kept moist by water-misting at least three times a day, and protected from extreme heat, freezing, high winds, and direct sunlight for a seventy-two hour period after finishing. Repointed areas shall be protected from rain for at least 12 hours after finishing.
- H. At the completion of the project, masonry surfaces shall be cleaned using plain water and natural bristle or nylon brushes as directed by the Architect. Use of chemical detergents will not be permitted for cleaning masonry.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Place continuous joint reinforcement in first and second joint below top of walls.
- B. Lap joint reinforcement ends minimum 6 inches (150 mm).

3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches (400 mm) on center.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.

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- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).

3.11 LINTELS

- A. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 - 1. Allow masonry lintels to attain specified strength before removing temporary supports.

3.12 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.13 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.
- D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).
- H. Maximum Variation for Steel Reinforcement:
 - 1. Plus or Minus 1/2" when distance from centerline of steel to opposite face of masonry is 8" or less.
 - 2. Plus or Minus 1" when the distance is between 8" and 24".
 - 3. Plus or Minus 1 1/4" when the distance is greater than 24".

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4. Plus or Minus 2" from location along the face of the wall.

3.14 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location. Provide lintels in accordance with 3.12 at openings whether scheduled or not.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.15 PARGING

- A. Dampen masonry walls prior to parging.
- B. Scarify each parging coat to ensure full bond to subsequent coat.
- C. Parge masonry walls in two uniform coats of mortar to a total thickness of 3/4 inch (19 mm).
- D. Steel trowel surface smooth and flat with a maximum surface variation of 1/8 inch per foot (1 mm/m).
- E. Strike top edge of parging at 45 degrees.

3.16 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.

3.17 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.18 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- B. Protect base of walls from mud and mortar spatter.
- C. protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.

- D. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

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SECTION 04 2001

MASONRY CLEANING AND RESTORATION

MASONRY CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:

- A. Building #16
 - 1. Repair basement window opening at East Elevation.
 - 2. Point Cracks in Brick, then parge exposed foundation.
 - 3. Repair, re-point, and re-stucco chimneys.
 - 4. Lightly clean and seal exposed brick chimneys.
- B. Building #18:
 - 1. Clean existing stucco and EIFS.
 - 2. Clean rust stains from granite slabs.
 - 3. Selectively restore brick masonry with re-pointing and replacement.
- C. Building #20:
 - 1. Clean existing stucco and EIFS.
 - 2. Clean rust stains from brick step at East porch.
 - 3. Selectively restore brick masonry with re-pointing and replacement.
 - 4. Remove existing 3 concrete steps at rear EL.
 - 5. Repair / restore rear entry concrete porch and steps, using salvaged materials.
 - 6. Clean and selectively re-point brick at rear framed entry.
- D. Building #22
 - 1. Clean existing stucco and EIFS.
 - 2. Clean rust stains from brick step at East porch.
- E. Building #24
 - 1. Selectively restore brick masonry with re-pointing and replacement (historic and modern walls) including basement window jams and around lintels.
 - 2. Clean stucco chimney above roof, repair and repaint.
 - 3. Clean rust stains from marble steps.
 - 4. Remove wood lintels from closed windows, install bricks and mortar to match.
- F. Building #26
 - 1. Selectively restore brick masonry with re-pointing and replacement (historic and modern walls)
 - 2. Clean stucco chimney above roof, repair and repaint.
 - 3. Remove loose cement parging at foundation, fill-in missing, and repoint entirely with metal lath and stucco.

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- G. Storage Shed
 - 1. Fully re-point existing brick piers under building.
- 2.01 MASONRY CLEANING SECTION OF SPECIFICATION
- 2.02 RELATED SECTIONS:
 - A. Section 07 9005 - Sealants
 - B. Section 08 2000 - Window & Door Restoration
 - C. Section 09 9000 - Painting and Finishing
- 2.03 REFERENCES
 - A. Masonry cleaning procedures shall adhere to the Guidelines of the Secretary of the Interior for Historic Preservation. Techniques employed for masonry cleaning shall be as outlined in Preservation Brief No. 1 (2000) "Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings" as published by the National Park Service. (The 2000 edition updates and expands the 1979 publication.)
 - B. ASTM D 5703-95 Standard Practice for Preparatory Surface Cleaning for Clay Brick Masonry.
- 2.04 SUBMITTALS
 - A. Product Literature: The Contractor shall submit manufacturer's product literature for all proprietary masonry cleaning products. Product literature shall include technical specifications, instructions for handling, mixing and application and Material Safety Data Sheets.
 - B. Cleaning Procedures: The Contractor shall submit his proposed schedule and sequence of cleaning operations for review by the Architect and the Owner prior to beginning work. No cleaning work shall begin until the sequence of operations is approved.
 - C. Samples: The Contractor, at locations designated by the Architect and in the presence of the Architect, shall prepare test panels of the following work using the specified cleaning products and methods:
 - 1. Hot pressurized water cleaning (steam) @ Brick: 3'-0" x 3'-0" area in two locations- on different façade (One must be North).
 - 2. Low-Pressure water washing (Brick): 3'-0" x 3'-0" area in two locations- on different façade (One must be North).
 - 3. 2. Chemical cleaning (Limestone and Cast Stone): 6 linear feet of cast stone band course at base of Building #25, and 4 sills at Building #25, at first and second floor.
 - 4. Cleaning of brick masonry of mastic, tar and sealant: 1'-0" x 1'-0" area.
 - 5. Reserved.
 - D. More than one test panel may be required to be acceptable for approval. The Contractor shall prepare at least three (3) test panels of each type, if necessary, without further compensation. Approved test panels shall become part of the work and shall serve as the quality standard for all similar work.

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2.05 QUALITY ASSURANCE

- A. The Contractor shall submit a Qualifications Statement (included with the Bid Documents) for approval prior to commencement of any work in this Section.

2.06 DELIVERY, STORAGE AND HANDLING

- A. Masonry cleaning materials and equipment shall be stored in such a manner as not to interfere with the operation and daily maintenance of the facility. Proposed material and equipment storage locations shall be approved by the Owner prior to delivery of the materials. Materials and equipment shall not be stored inside the building.
- B. Waste material, packaging, debris and effluent associated with the masonry cleaning work shall be collected and disposed of in accordance with local, state and federal environmental regulations.
- C. Masonry cleaning materials shall be delivered in manufacturer's original packaging with product name and manufacturer clearly visible thereon and shall be stored in accordance with the manufacturer's instructions. Protect from direct sunlight and temperatures above or below the manufacturer's suggested range.

2.07 PROJECT CONDITIONS

- A. The work of this Section shall be executed only when the air and surface temperatures are 50 degrees F and rising or less than 90 degrees F and falling or within the ranges directed by the cleaning product manufacturer, where applicable. Minimal temperature for masonry cleaning shall be expected to remain 50 degrees F and above for at least 2 hours after completion and anticipated to be above 40 degrees F for at least two weeks after completion.
- B. The Contractor is responsible for protecting existing adjacent materials during the execution of the work. Provide all necessary protection and work procedures to avoid damage to existing material assemblies not a part of the work of this Section. At a minimum, the Contractor shall:
1. The Contractor shall be responsible for the removal of effluent from cleaning operations, waste materials, packaging and other debris associated with the work of this Section in a manner conforming with federal, state and local environmental regulations. Alkaline or acidic runoff must be neutralized before disposal.
 2. Protect surrounding trees and vegetation from runoff and biocidal cleaning solutions by using polyethylene or other waterproof membrane to collect runoff for disposal.
 3. The Contractor shall erect waterproof enclosures around areas where cleaning operations are in progress to protect nearby property and passers-by from overspray and wind drift of cleaning chemicals or rinse water. Erect barricades and install yellow caution tape and signage as required to restrict access to work areas.
- C. Contractor personnel performing masonry cleaning operations shall be provided with gloves, respirators and protective clothing as recommended by the manufacturer of the masonry cleaning products.
- D. Access to work areas shall be from the exterior only. Where access to the building interior is required, the Contractor shall coordinate with the Owner's representative. Under no circumstances are cleaning materials to be stored in or transported through the building.

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- E. The Contractor shall provide alternate means as required to route of the contractor and worker traffic around the work areas. The Contractor shall submit a building access plan to the Architect and Owner for review prior to beginning construction operations indicating the proposed routes of access and egress during the course of the project.

PART 2 - PRODUCTS

3.01 GENERAL

- A. Water: Cleaning water shall be potable, free of injurious amounts of oil, soluble salts, alkali, acids and other impurities which might stain or otherwise damage masonry.

3.02 BRICK, STUCCO & STONE CLEANING MATERIALS

- A. Low-Pressure Water Rinse: Water shall be potable, non-staining and free of soluble salts, oils, organic matter and other substances deleterious to the surfaces to be cleaned. No detergents or other agents shall be added to cleaning water unless specifically directed by the Architect.
- B. D/2 Architectural Biocide as distributed by Cathedral Stone Products, Inc. Jessup, MD (800) 684-0901. No substitutions will be permitted.
- C. For spot treatment of heavily soiled limestone areas: BioKlean as manufactured by ProSoCo, Inc., Kansas City, KS (913) 281-2700. No substitutions will be permitted.
- D. Brick cleaning products shall contain no muriatic, hydrochloric or hydrofluoric acids.

3.03 REMOVAL OF MASTIC, TAR ETC.

- A. Cleaning agent for removal of asphalt, tar, etc. shall be a product of one of the following manufacturers:
1. Asphalt & Tar Remover as manufactured by ProSoCo, Inc., Kansas City, KS (919) 281-2700.
 2. Tar-Gone as manufactured by Arrow-Magnolia, Dallas, TX (877) 277-6998.
 3. Black Mastic Remover as manufactured by Dumond Chemicals, New York, NY (212) 869-6350.

3.04 ACCESSORIES AND RELATED MATERIALS

- A. Temporary Sealant: Non-staining, removable sealant suitable for masonry substrates.
- B. Brushes for scrubbing masonry shall be stiff-bristle, non-metallic brushes as recommended by the manufacturer of the masonry cleaning products.

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PART 3 - EXECUTION

4.01 GENERAL

- A. Masonry cleaning is to be completed prior to masonry repointing and repairs. Remove and store light fixtures and other appurtenances to ensure full access to wall surfaces. Remove all metalwork to be restored, prior to cleaning.
- B. The Contractor shall inspect the areas to be cleaned prior to commencing operations. Large cracks (1/8" or larger) and open joints discovered must be temporarily filled with removable sealant to prevent penetration of cleaning solutions behind the stone cladding and terrace cotta castings.
- C. Windows and window frames shall be protected using polyethylene and temporary sealants as required during water soaking. The Contractor shall maintain at least one employee on the interior of the building to monitor window and wall conditions during cleaning. Work shall cease immediately if leakage is discovered inside the building and shall not resume until the cause is identified and corrected.
- D. Limestone and cast stone surfaces shall be saturated with water prior to application of chemical cleaning products to prevent undesirable absorption of cleaning chemicals unless otherwise indicated by the manufacturer of the proprietary cleaning product.
- E. Protect all metal, glass and painted surfaces adjacent to areas to receive chemical cleaning or water repellent using plastic, plywood, sealants or other materials as required to prevent penetration of cleaning chemicals. The Contractor shall be responsible for surface etching and other damage caused to adjacent materials.

4.02 MASONRY CLEANING

- A. Brick Cleaning
 - 1. Low pressure water washing
 - a. Pressure washing of designated areas shall proceed from the bottom of the area to the top.
 - b. Using a nozzle pressure of 100 psi or less (based on the results of the test panel) and a fan tipped spray nozzle, the water spray shall be directed at the brick surface from a distance of not less than 12 inches.
- B. Stone Cleaning
 - 1. Hot pressurized water cleaning (steam)
 - a. Pressure washing of designated areas shall proceed from the bottom of the area to the top.
 - b. Using a nozzle pressure of 300 psi or less (based on the results of the test panel) and a fan tipped spray nozzle, the steam spray shall be directed at the terrace cotta surface from a distance of not less than 12 inches.
- C. Chemical cleaning

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1. Chemical cleaning of designated areas shall proceed from the bottom of the area to the top. Wet surfaces to be cleaned thoroughly prior to application of cleaning chemicals to prevent excessive absorption into the stone.
 2. Apply specified cleaning product in accordance with the manufacturer's printed instructions. Do not exceed recommended solution concentrations or dwell times. Cleaning solutions shall be applied by hand using a fiber brush or sponge. Cleaning solutions may not be applied using pressure-washing equipment.
 3. Allow cleaner to dwell on the stone surface for 3 to 5 minutes. Reapply and scrub stubborn stains.
 4. Rinse all cleaned areas thoroughly to remove all traces of cleaner from cracks and corners. Rinse down adjacent materials to prevent discoloration or streaking from cleaning chemicals.
- D. Removal of Mastic, Tar, Etc.
1. Clean bituminous material from surfaces of walls using wood scrapers to remove bulk of material prior to applying specified remover.
 2. Clean surfaces of masonry using specified cleaning agent in accordance with manufacturer's instructions.
 - a. Pre-wet the surface with clean water.
 - b. Thoroughly rinse the surface after cleaning and apply neutralizing agent if required by manufacturer.
 - c. Keep area below stained area wet and rinsed free of cleaning residues.
 - d. Remove protective coverings from adjacent surfaces and repair any damage or staining caused by the cleaning operation to adjacent surfaces.

END OF MASONRY CLEANING

MASONRY RESTORATION SECTION OF SPECIFICATION:

5.01 RELATED SECTIONS

- A. Section 07 9005 - Sealants
- B. Section 08 2000 - Window & Door Restoration
- C. Section 09 9000 - Painting and Finishing

5.02 REFERENCES

- A. Masonry restoration shall conform to the Guidelines of the Secretary of the Interior for Historic Preservation. Techniques employed for masonry cleaning, pointing and repair shall be as outlined in "Preservation Brief No. 2, Repointing Mortar Joints in Historic Masonry Buildings" (October 1998) as published by the National Park Service.
- B. Masonry restoration work shall comply with ACI / ASCE 530.1-88. Contractor shall maintain at least one copy of ACI / ASCE 530.1-88 on site.
- C. American Society for Testing and Materials (ASTM):
 1. C 144 Standard Specification for Aggregate for Masonry Mortar
 2. C 150 Standard Specification for Portland Cement

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3. C 207 Standard Specification for Hydrated Lime for Masonry Purposes
4. C 216 Standard Specification for Facing Brick
5. C 270 Standard Specification for Mortar for Unit Masonry

5.03 SUBMITTALS

- A. Submittals: The Contractor shall submit the following materials for new masonry components. Provide a range of samples for selection (at least 3).
 1. Replacement Brick, red clay - VERIFY EXISTING BRICK DIMENSIONS IN FIELD.
- B. Product Data: Contractor shall submit product data for all manufactured masonry pointing, grouting and patching materials. Manufacturer's product data shall include certification of compliance with specified standards and instructions for handling, storage and installation of the material. Also submit Material Safety Data Sheets for each material.
- C. Samples: The Contractor shall submit samples of the following masonry repair and replacement materials for approval of color and texture match. No masonry restoration work shall proceed until all samples are approved.
 1. Cured samples of each type of pointing mortar.
 2. Cured sample of each type of patching mortar.
 3. Stainless steel anchors / galvanized reinforcement.
 4. Cured sample of cement parging (for existing Chimneys and foundations).
- D. Contractor shall use only OSHA approved scaffolding and equipment and is solely responsible for safety at the site.

5.04 QUALITY ASSURANCE

- A. The Contractor performing the work of this Section shall have a minimum of five years of experience in masonry repointing and restoration and shall have successfully completed at least five projects of similar scope within the previous three years.
 1. Field Supervision: The masonry cleaning contractor must maintain an experienced full-time supervisor on the job site at all times that masonry restoration operations are in progress.
 2. The job site supervisor shall have successfully completed a minimum of three similar restoration projects in the employ of the masonry restoration firm which meet all of the following criteria:
 - a. project completed within the last five years;
 - b. subject structure was listed on the National Register of Historic Places (or certified eligible for listing) at the time the work commenced;
 - c. work included patching, repointing and replacement of masonry completed in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties;
 - d. construction value of the masonry restoration portion of each project shall have been at least \$10,000.
 3. The Contractor shall submit a statement for each of the installing persons, indicating their past experience with, and training for, installation of the materials to be used in the work of this Section.

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4. The Contractor shall submit a certification from the patching mortar manufacturer stating that the installing persons have been trained in the application of the patching mortar.
- B. After completion of the masonry cleaning mock-ups specified in the Section above, the Contractor, at locations designated by the Architect, shall prepare test panels of the following work:
 1. Brick Restoration: Prepare 5 linear feet sample demonstrating brick restoration techniques, including repointing and brick replacement. Mock-ups shall display the full range of materials and workmanship required for completion of the project for approval by the Architect & Owner.
 2. Liquid water repellent sealer: Four Linear feet of band and 4 window sills.
- C. More than one test panel may be required to be acceptable for approval. The Contractor shall prepare at least three (3) test panels of each type, if necessary, without further compensation. Approved test panels may become part of the work and shall serve as the quality standard for all similar work.
- D. To ensure consistent quality, color, pattern and texture matching, the Contractor shall not change sources or manufacturers of mortar or brick materials during the course of the work.

5.05 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered to the site in original packaging, unopened, with manufacturer's name and product identification thereon. Cementitious materials shall be protected from contamination by foreign matter and deterioration by moisture or temperature. Contaminated or deteriorated material shall not be used. Products stored longer than six months shall not be used.
- B. Masonry materials shall be stored in such a manner as not to interfere with the operation and daily maintenance of the facility. Proposed storage locations shall be approved by the Owner prior to the delivery of materials. Masonry materials shall not be stored inside the building.
- C. Prepared injection and patching mortars shall be protected from direct sunlight and wind when the ambient temperature exceeds 70° F.
- D. Store new stone materials in such a manner as to minimize handling prior to installation. Units that are cracked, chipped or otherwise damaged during handling and storage shall not be installed in the work.

5.06 PROJECT CONDITIONS

- A. The work of this Section shall be executed only when the air and surface temperatures are 40 degrees F and rising or less than 90 degrees F and falling, or as directed in writing by the manufacturer. No masonry pointing or patching work shall proceed while there is visible frost, snow or ice present on the masonry surfaces.
- B. The Contractor is responsible for protecting existing adjacent materials during the execution of the work. Provide all necessary protection and work procedures to avoid damage to existing material assemblies not a part of the work of this Section. At a minimum, the Contractor shall:

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1. Prevent penetration of dust from masonry repair operations into the building by protecting all windows, ventilation openings and HVAC equipment in the vicinity of the work area.
 2. Protect open copings, reglets and other vulnerable areas from water penetration to prevent leakage during the course of the work. Open areas shall not be left exposed overnight or when inclement weather is predicted.
 3. Protect window glass, sash and frames with plywood or other sturdy barrier during repointing and repair of lower portion of cornice.
 4. Protect the existing roof surface from damage during the course of the masonry restoration work. Repair all damage to membrane, flashings, etc. to the satisfaction of, and at no additional cost to, the Owner.
 5. Where existing masonry components are to be removed, protect adjacent masonry units and surfaces from chipping and cracking during the removal process. Where components are to be reinstalled, the Contractor shall store salvaged components in a safe location. Protect from theft and damage until reassembly.
- C. Provide visible barriers and / or warning tape around the perimeter of the work area and below elevated work areas. Provide secure enclosures to prevent unauthorized access to scaffolds and work areas.
- D. Stone, brick, mortar, waste material, packaging and other debris associated with the masonry work shall be disposed of in accordance with local, state and federal environmental regulations. Remove debris from masonry restoration work from the site on a daily basis and at the completion of the work.
- E. The Contractor shall coordinate work involving other trades so as not to delay the project schedule.
- F. Access to all work areas is from the exterior only (except basement areaways). Permission from the Owner is required to access interior spaces. Under no circumstances are materials to be transported through the buildings.

PART 2 - PRODUCTS

6.01 BRICK (REPLACEMENT MATERIALS)

- A. Red Clay Brick - Brick Industry Association manufacturers only, Provide with consistent color and texture range, to match each area, throughout the work. Units shall be sound and free from cracks, chips and other defects that may affect strength or appearance.
- B. Fabricate new brick components to match size, profiles, depth and surface treatment to match features of existing material to be replaced. Faces shall be cut plumb, straight and level. Molded edges shall be straight and crisp.

6.02 POINTING MATERIALS AND MIXES

- A. Portland Cement: ASTM C 150, Type I, non-staining and without air entrainment. Gray and white Portland cement may be combined as required to match the desired color.
- B. Hydrated Lime: ASTM C 207, Type S.

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- C. Sand: ASTM C 144, free of clay, silt, soluble salts and organic matter and shall match the color and texture of the original mortar sand.
- D. Water: Potable, free from injurious amounts of oil, soluble salts, alkali, acids, organic impurities and other deleterious substances which impair mortar strength or bonding.
- E. Colorants (if required for exact color match): Non-fading, mineral oxide masonry pigment as manufactured by Solomon Grind-Chem Services, Riverton Lime Co, Medusa or other approved manufacturer.
- F. Admixtures: No admixtures, other than mortar pigment, are permitted.
- G. Type N mortar shall be used in the following locations:
 - 1. Bedding and pointing mortar for both new and existing brick
 - 2. Type N mortar shall be mixed in the following proportions:
 - a. 1 part hydrated lime by volume
 - b. 1 part Portland cement by volume
 - c. 6 parts sand by volume
 - d. Colorant not to exceed ½ part

6.03 MIXING PROCEDURES

- A. Bedding and Pointing Mortars:
 - 1. Mix mortars in accordance with ASTM C 270.
 - 2. Measure materials by volume or equivalent weight. Do not measure by shovel.
 - 3. Mix ingredients in a clean mechanical batch mixer for a minimum of 3 to 5 minutes.
 - 4. Mortar shall stand for 20 minutes prior to use to allow for initial shrinkage. Place mortar in final position within two hours of mixing. Do not re-temper or use partially hardened mortar.
- B. Cement parging: (for existing concrete foundations)
 - 1. Mix in accordance with ASTM C-270.
 - 2. Parging shall be mixed in compliance with the recommendations of the Portland Cement Plaster (Stucco) Manual as published by the Portland Cement Association and ASTM C-926.
 - 3. Measure materials by volume or equivalent weight. Do not measure by shovel.
 - 4. Mix ingredients in a clean mechanical batch mixer for 3 to 5 minutes.
 - 5. Pre-hydrate parging to reduce shrinkage. Lime and sand shall be thoroughly mixed. Add only enough water to produce a damp, unworkable consistency which will retain its shape when formed into a ball. Parge shall stand in this condition for 1 to 2 hours. Add Portland cement and remainder of water to provide a workable consistency.
 - 6. Do not use re-tempered or partially hardened parging.

6.04 MASONRY ACCESSORIES

- A. Pins for attachment of broken granite and concrete shall be AISI Type 304, 1/4" diameter, threaded, stainless steel rods.
- B. Mortar / grout for setting of stainless steel pins and resetting existing masonry struts and anchors shall be single component, non-shrink, non-metallic, cementitious product. Setting

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mortar / grout shall achieve a minimum strength of 6500 psi. Setting mortar / grout shall be a product of one of the following manufacturers:

1. Cathedral Stone Products, Jessup, MD.
2. Master Builders Technologies, Inc., Cleveland, OH.
3. Sto Corporation, Atlanta, GA.

C. Chemical Bonding Agent

1. Larsen Products Weld-Crete

6.05 WATER REPELLENT SEALER FOR EXPOSED BRICK MASONRY

- A. Water repellent for use at designated locations shall be a clear, penetrating, alkali-resistant siloxane such as Sure Klean Weather Seal Siloxane, manufactured by ProSoCo, Inc., Kansas City, KS, or Architect approved equal. Product shall be used as packaged. Do not dilute or mix the water repellent product with any other substance.

PART 3 - EXECUTION

7.01 GENERAL

- A. Complete masonry cleaning prior to masonry repair and repointing. New patching materials and mortars shall be matched to the color of the cleaned limestone and granite. Match new pointing mortar to the existing.
- B. Examine areas and conditions under which masonry restoration is to be performed. Notify the Architect of any conditions detrimental to the proper and timely completion of the work. Do not commence work until all unsatisfactory conditions have been adequately corrected.

7.02 DISASSEMBLY AND UNIT REPLACEMENT (BRICK)

- A. Remove or cut existing metal masonry supports and cramps and loosen adjacent flashings and adhesives prior to beginning removal of stone masonry. Remove as much mortar as possible from joints surrounding the component to be removed, using only hand tools for deeply embedded mortar. Avoid excessive prying against the arrises of the masonry units to avoid spalling and chipping. Dismantle adjacent assemblies as required for access to the damaged masonry, salvaging components for reuse to the greatest extent possible.
- B. Remove masonry units to be replaced, repaired or reset. Clean all contact surfaces on all components to remain to remove old mortar and mastic and ensure level bedding and adequate bonding with new mortar once reassembled.
- C. Reinstall masonry elements level, straight and plumb in their original locations on a full mortar bed. Ensure that vertical head joints are completely filled with mortar. Rake and point as described below. Install replacement masonry elements to match the original configuration.
- D. The diameter of the holes for stainless steel anchor pins shall be drilled 1/8 inch greater than the diameter of the pins. The use of hammer drills is not permitted. Anchor pins in specified bedding mortar.

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- E. Use lead, slate or plastic shims of the thickness required to maintain the required joint width. The use of wood shims is not permitted.
 - F. Point joints surrounding new replacement units to match existing adjacent mortar joints.
- 7.03 CRACK INJECTION GROUTING (BRICK & STONE CRACKS)
- A. Rout the length of the crack to be repaired. Install temporary sealant, leaving injection ports at regular intervals in accordance with manufacturer's instructions. Test the seal using an initial injection of plain water and reseal as necessary.
 - B. Begin grouting at the lowest injection port, continuing until grout is visible at the next injection port. Plug and proceed to the next injection port. Continue grouting from bottom to top until the length of the crack is sealed.
 - C. Leave sealant in place until the grout has attained its initial set. Remove and clean masonry surface as required. Allow grout to cure prior to application of crack patching mortar.
 - D. After the grout has cured, the final mortar fill may be applied. Rout crack as required to provide key for patching mortar. The area to be filled shall be thoroughly wetted to prevent dehydration of the mortar. Using the approved patching mortar, fill the crack proud and work mortar in as tightly as possible until flush with the masonry surface. Remove excess mortar. Filled areas shall be kept damp to allow a full cure.
- 7.04 POINTING (ALL MASONRY)
- A. Complete masonry repairs prior to starting repointing work.
 - B. Areas of stone masonry to be repointed are as indicated on the Drawings. The extent of the work shall be reviewed with the Architect on site prior to commencing operations.
 - C. Remove all nails, hooks and surface attachments from masonry and masonry joints. Rake loose, damaged mortar out of the joints using a chisel less than a 1/4" in width or by mechanical grinding using a carborundum blade. Prying against the arrises of the masonry units shall be avoided. Do not chip or spall the edges of the masonry. Clean all mortar from surfaces within the joint so that new pointing mortar bonds to the building material rather than to old mortar. Rake back a minimum of 1/2" to sound mortar. Brush, vacuum or blow joints clean with compressed air to remove dirt and loose debris. If work is found unacceptable, all raking shall cease without additional cost to the Owner until deficiencies in tools, workmanship or methodology have been corrected to the Architect's satisfaction.
 - D. For mortar application, the joints shall be thoroughly moist but not visibly wet with standing water.
 - E. Apply mortar in 1/4 inch thick layers, allowing each layer to reach initial set / thumbprint hardness before applying succeeding layer. Work mortar into full depth of joint using a flexible tool.
 - F. When final layer of mortar is thumbprint hard, tool joint as required to match existing profile. Avoid feather-edging of joints. Remove and dispose of excess mortar from the joint edges promptly before it can set or stain the masonry.

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- G. Keep joints damp for 72 hours after repointing using damp burlap, plastic or other waterproof membrane.
- H. The Contractor shall leave the masonry clean of mortar, grease or other spots. Cleaning compounds proposed for use shall be approved by the Architect prior to use.
- I. Acid cleaning will not be permitted, so use all reasonable means to keep the exposed masonry work clean while repairs and repointing are completed.

7.05 PARGING (Concrete Foundation Walls at Buildings #16 & # 26 and Chimneys)

- A. Perform all repair work on brick, parged and concrete masonry surfaces, etc. before commencing this repair work. Protect existing membrane roofing and metal flashing during this repair work.
- B. Remove existing synthetic parging as specified in Section 04510 - Masonry Cleaning.
- C. Apply manufacturer's recommended coat or coats of polymer chemical bonding agent, and apply a rendering coat of parging in a minimum thickness of 1/2". Smooth flat and scratch with a comb or otherwise key surface to receive finish coat. Allow to cure a minimum of two days before applying finish coat.
- D. Dampen surface of first coat and apply top coat to depth of adjacent finish material. Finish with wood float to produce plumb and level surface. Final surface texture to match test panel as approved by the Architect.
- E. Keep parging damp for 24 hours after using damp burlap, plastic or other waterproof membrane to allow for curing.
- F. The Contractor shall leave parged walls clean of mortar, grease or other spots.

7.06 WATER REPELLENTS

- A. For application to exposed brick chimneys at Building #16, above roof:
 - 1. All masonry cleaning, repointing and repair work shall be completed prior to application of water repellent treatments.
 - 2. Apply product using airless spray equipment equipped with solvent resistant hoses and fittings.
 - 3. Working from bottom to top, apply two saturating coats, one immediately after another, in accordance with the manufacturer's instructions.
 - 4. When dried, the water repellent shall cause no visible change in the color, texture or gloss of the limestone surfaces.

END OF SECTION

SECTION 05 2000

ARCHITECTURAL METALWORK

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PART 1 - GENERAL

1.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:

- A. Building #16
 - 1. Remove, restore, refurbish and reinstall existing handrails at porches as noted.
 - 2. Replace stair nosing fasteners where noted.
 - 3. Refurbish metal shutter hardware during shutter restoration.
- B. Building #18:
 - 1. Remove, restore, refurbish and reinstall existing handrails at porches as noted.
 - 2. Refurbish metal shutter hardware during shutter restoration.
- C. Building #20:
 - 1. Fabricate and install new code compliant metal handrailing at front porch steps.
 - 2. Refurbish metal shutter hardware during shutter restoration.
 - 3. Install code-compliant metal guard and handrails at concrete porch at rear.
 - 4. Remove and replace metal handrails at rear brick entry steps.
- D. Building #22
 - 1. Remove, restore and re-install 2 metal guards at front porch, with 2 new handrails.
 - 2. Refurbish metal shutter hardware during shutter restoration.
- E. Building #24
 - 1. Remove, refurbish and re-install existing metal swinging gate at alley.
 - 2. Remove, refurbish & reinstall 2 metal basement window grates.
- F. Building #26
 - 1. Remove, refurbish and re-install existing metal coal chute hatch.
 - 2. Remove, refurbish & reinstall 2 metal basement window grates.
 - 3. Remove and replace existing metal basement areaway doors.
- G. Storage Shed
 - 1. Reserved

1.02 RELATED SECTIONS:

- A. Section 04200 - Masonry Cleaning and Restoration
- B. Section 06200 - Carpentry
- C. Section 07900 - Sealants

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1.03 REFERENCES

- A. National Association of Architectural Metal Manufacturers (N.A.A.M.M.) Code of Standard Practice for the Architectural Metal Industry, Publication AMP-555, December 1992.
- B. National Association of Architectural Metal Manufacturers (N.A.A.M.M.) Metal Finishes Manual for Architectural and Metal Products, Publication AMF-507, 1988.
- C. Handrail and Railing Structural Performance: ASTM E 985.

1.04 SUBMITTALS

- A. Shop Drawings: The Contractor shall submit shop drawings for all new metal fabrications. Shop Drawings shall include all applicable dimensions, gauge and finish of materials, connection and installation details, etc.
- B. Product Literature, New Materials: Submit manufacturer's product literature for all proprietary products including specification data, instructions for handling and use and Materials Safety Data Sheets.

1.05 QUALITY ASSURANCE

- A. Fabrication, finishing and installation of metalwork shall conform to the standards set forth in the Code of Standard Practice for the Architectural Metal Industry.
- B. No substitutions for specified products shall be made without full submittal of manufacturer's product literature and without prior approval of the Architect.
- C. The Contractor performing the Architectural Metalwork shall have a minimum of five years experience in fabrication and installation of metal railings.
 - 1. The Contractor shall prepare shop drawings of the specified guards and railings, for review and by the Architect.
 - 2. Provide 2 samples of each profile of the materials proposed, for review of compliance with the specifications.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in the manufacturer's original packaging with brand and product identification clearly visible thereon. Store materials in such a manner to avoid deterioration by moisture, temperature or contamination.
- B. Items to be installed shall be packaged for transport using sturdy, padded containers to prevent scratches, dents, breakage or other damage. Damage that occurs during transport and handling shall be repaired to the satisfaction of and at no additional cost to the Owner.

1.07 PROJECT CONDITIONS

- A. All fabrication of new metalwork shall be performed off site.

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- B. The work of this Section shall be executed only when the air and surface temperature is at least 40 degrees F and rising or less than 90 degrees F and falling.
- C. The Contractor is responsible for protecting existing adjacent materials during the execution of the work. Provide all necessary protection and work procedures to avoid damage to existing materials assemblies not a part of the work of this Section.
 - 1. Protect adjacent wood framing members and floor boards from damage. Any such damage resulting from the work of this section shall be repaired to the satisfaction of, and at no additional cost to, the Owner.
 - 2. The Contractor shall coordinate with other trades directly or indirectly affected by the work of this Section including, but not necessarily limited to, carpentry, wood restoration and sealants.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes when exposed to view in the finished unit. Visible surfaces which exhibit pitting or other imperfections in the finished units will not be acceptable.

2.02 NEW MATERIALS

- A. Guard Rails / Hand Rails
 - 1. Low Carbon (mild) Steel Alloy 1018, in bar and channel sizes indicated on the drawings, with powder - coated (black) finish after fabrication.
 - 2. Custom fabricate to configurations and dimensions shown on the drawings and verified by the contractor in the field.
 - 3. Apply factory-installed powder coating on all metal objects while being built anew, restored and / or altered in shop conditions.
- B. Suppliers:
 - 1. Products of the following manufacturers are also acceptable:
 - a. Metal Stock, Inc., Philadelphia, PA, 215-335-2003.
 - b. A & S Steel Company, Philadelphia, PA, 215-831-5020.
 - c. Architect approved equal.

2.03 ACCESSORIES

- A. Anchors, Flanges and Inserts: Provide miscellaneous fasteners and anchors as required for the complete installation of architectural metal items.
- B. Fasteners: Unless otherwise shown, provide non-removable type screws for exposed fasteners. Select fasteners for type, grade and class required.
- C. Provide 3/8" diameter stainless steel screws for installation of guard rail.
- D. Match size of existing screws for nosing re-attachment.

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PART 3 - EXECUTION

3.01 GENERAL

A. Workmanship:

1. Use materials of size and thickness indicated or as required to produce strength and durability in finish product for use intended. Work to dimensions shown or accepted on shop drawings, using standard details for fabrication and support. Use type of materials shown or specified for various components.
2. Form exposed work true to line or level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.
3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Philips flat head (countersunk) screws or bolts.
4. Provide anchorage of the type shown, coordinated with the supporting structure. Fabricate and space anchoring devices to provide adequate support for the intended use.
5. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

3.02 NEW GUARD RAILINGS

- A. Install the work of this Section in strict accordance with the approved Shop Drawings.
- B. Provide anchorage devices and fasteners where necessary for securing metal fabrications in place. Anchors and fasteners include threaded fasteners for inserts, toggle bolts, through bolts, lag bolts, and other connectors as required.
- C. Perform all cutting, drilling and fitting required for the installation of the miscellaneous metals items. Set the work accurately in location, alignment and elevation; plumb, level, true and free of rack, measured from established lines and levels.
- D. Provide expansion joints as needed to allow for thermal expansion or contraction.

3.03 CLEANING:

- A. As installation is completed, wash thoroughly using clean water and soap; rinse with clean water. DO NOT use acid solution, steel wool or other harsh abrasives. Finish must not be removed from painted steel. If this occurs, return component to shop for re-powder coating.

END OF SECTION

SECTION 05 5200

HANDRAILS AND RAILINGS

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PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Steel tube railings, balusters, and fittings.
 - 2. Handrails.

1.02 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- B. Design Data: Submit structural design calculations signed and sealed by professional engineer.
- C. Samples:
 - 1. Submit two handrail samples, 12 inches long.
 - 2. Submit two samples of fittings, wall brackets, escutcheons, and end stops.
 - 3. Submit two baluster infill panel samples, 12 x 12 inches in size.

1.03 QUALITY ASSURANCE

- A. Prepare Shop Drawings under direct supervision of a professional engineer experienced in design of this work and licensed in the State where the Project is located.

1.04 PROJECT CONDITIONS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.01 DESIGN REQUIREMENTS

- A. Design handrail, guardrail, and attachments to resist forces as required by IBC. Apply loads non-simultaneously to produce maximum stresses.
 - 1. Guard Top Rail and Handrail Concentrated Load: 200 pounds applied at any point in any direction.
 - 2. Intermediate Rails, Panels, and Baluster Concentrated Load: 50 pounds applied to 1 sf area.

2.02 STEEL RAILING SYSTEM COMPONENTS

- A. Steel Materials:

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1. Rolled Sections: ASTM A36/A36M.
2. Tubing: ASTM A513, Type 5, minimum 50 ksi yield strength.
3. Plates: ASTM A283/A283M.
4. Pipe: ASTM A53, Grade B.
5. Bolts, Nuts, and Washers: ASTM A325, hot-dip galvanized to ASTM A153/A153M for galvanized components.
6. Welding Materials: AWS D1.1; type required for materials being welded.
 - a. Rails and Posts: 1-1/2 inch outside diameter steel tubing, welded joints.
7. Balusters: 3/4 inch diameter steel bar.
 - a. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast steel.
 - b. Mounting: Adjustable brackets and flanges.
8. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
9. Splice Connectors: Steel concealed spigots.

2.03 ACCESSORIES

- A. Grout: ASTM C1107 and CE CRD C621; Non-shrink type, premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 5,000 psi at 7 days.
 1. Five Star Products, Inc.; Five Star Grout.
 2. L&M Construction Chemicals, Inc.; DuragROUT.
 3. Euclid Chemical Company; NS Grout.
 4. Substitutions: In accordance with Contract Documents.
- B. FABRICATION
 1. Fit and shop assemble components in largest practical sizes for delivery to site.
 2. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
 3. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
 4. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
 5. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 6. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler or continuous welds.
 7. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
 8. Accurately form components to suit ramps, stairs, and landings, to each other and to building structure.
 9. Accommodate for expansion and contraction of members and building movement without damage to connections or members.
- C. SHOP FINISHING - ALUMINUM
 1. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

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- a. Color and Gloss: As selected by Architect from manufacturer's full range.
 - 1) Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

D. SHOP FINISHING - STEEL

1. Component Finishes:
 - a. Interior Locations: Shop prime one coat.
 - b. Exterior Components: Hot-dipped galvanized.
2. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
3. Do not paint surfaces in direct contact with concrete or where field welding is required.
4. Galvanizing: ASTM A123; hot dip galvanize after fabrication.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify concealed blocking and reinforcement is installed and correctly located to receive wall mounted handrails.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.03 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Anchor railings to structure with anchors, plates or angles.
- C. Set railing in sleeves where indicated. Grout annular space between sleeves and railing posts.
- D. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Assemble with spigots and sleeves to accommodate tight joints and secure installation.
- F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.
- G. Finish paint steel components as specified in Section 09900.

END OF SECTION

SECTION 05 5201

ALUMINUM HANDRAILS

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Graspable Hand Rail

1.02 PERFORMANCE REQUIREMENTS

- A. General: Handrails and railings shall withstand structural loading as determined by allowable design working stresses of materials based on the standards as noted in the following:
1. Aluminum: AA 30
- B. Structural Performance: Provide handrails and railing capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors and connections:
1. Top Rail and Supports:
 - a. Capable of withstanding a concentrated load of 200 pounds (90.6 kg) applied to top rail at any point and in any direction
 - b. Capable of withstanding a uniform load of 50 pounds per linear foot (74.3 kg), applied to top rail horizontally with a simultaneous load of 100 pounds per linear foot (148.6 kg/m) applied vertically downward. ?c. The railing design is not intended for both concentrated and uniform loads to be applied concurrently.
 2. Handrails Not Serving as Top Rails:
 - a. Concentrated load of 200 pounds per foot (0.89kN) applied at any point and in any direction
 - b. Uniform load of 50-lbf-ft. (0.07kN) applied in any direction
 - c. Concentrated and uniform loads need not be assumed to act concurrently
 3. Structural Performance of Guardrail Infill:
 - a. Capable of withstanding a horizontal concentrated load of 200 pounds (90.6 kg), applied to a 1-foot (30.5 mm) square area at any point on infill.
 - b. The following components constitute infill: the panels, the intermediate rails, the balusters, and other miscellaneous elements
 - c. Concentrated and uniform loads need not be assumed to act concurrently
 4. Thermal Movements
 - a. Handrail and railing is designed to accommodate fluctuations from 120 degree F (49 C) in ambient temperatures to 180 degree F (82 C) surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
 5. Corrosion Resistance
 - a. Incompatible materials are separated to prevent galvanic corrosion.

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1.03 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, includes the following:
 - 1. Instructions and recommendations for preparation
 - 2. Storage and handling requirements and recommendations
 - 3. Methods and instructions for installation
 - 4. Description of materials, components, fabrication, and finishes
 - 5. Structural test reports outlining specification compliance

1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualifications - All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.
- B. Installer Qualifications - All products listed in this section should be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer until ready for installation.
- B. Protect materials and finish from damage during handling and installation.

1.06 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Verify field measurements before fabrication.
- C. Coordinate field measurements and fabrication schedule with construction progress to avoid delays.

1.07 WARRANTY

- A. At project completion, the Owner or Owners Representative, shall be supplied with a certificate outlining the terms and conditions and limitations of the Lifetime Limited Warranty.
 - 1. Material Warranty: Twenty (20) Years
 - 2. Finish Warranty: 10 years for baked enamel or 20 years for Kynar.

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PART 2 PRODUCTS

- 2.01 Acceptable Manufacturer: Atlantic Aluminum Products Incorporated, which is located at 12144 Sussex Highway; Greenwood, DE 19950; Toll Free: 801-601-1878, Telephone: (302) 349-9091, Fax: (302) 349-0138, Email: aap@atlanticaluminumproducts.com, Web: aaprailing.com.
- 2.02 Materials
- A. Extrusion Alloy: Aluminum 6063-T5, 6063-T6, 6061-T6, or 6005A-T61.
- B. Screws and anchors: Corrosion resistant made of 304 Stainless Steel.
- 2.03 GRABRAIL ADA HANDRAIL SYSTEMS
- A. Grabrail Posts and Rails:
1. Material: Aluminum 6063-T52 meeting or exceeding the requirements of ASTM B 429.
 - a. Tensile Strength (Minimum): 30000 psi.
 - b. Yield Strength (Minimum): 25000 psi.
 - c. Allowable Yield Strength: 18000 psi.
 - d. Modulus of Elasticity: 10100 ksi.
 2. Rail Size: 1 1/2 inch:
 - a. O.D.: 1.500 inches (38.1 mm).
 - b. I.D.: 1.250 inches (31.75 mm).
 - c. Wall: 0.125 inches (3.175mm).
- B. Mounting Options
1. Surface Mount
 2. Grout and Anchoring Cement or Core Drill
 3. Face Mounted
- C. Guardrail Height? 1. 42 inches (1067 mm) above finished surface
- 2.04 Colors and Finishes
- A. Colors:
1. White: Duracron White UC -107616
 2. Duranar White: UC-96818
 3. Black: Duracron S600 L/G Black UC- 61204
 4. Bronze: Duranar XL Bronze UC-96808
 5. Duracron Bronze: UC-66721
 6. Clay: UC 100603
- B. Finishes:
1. Electrostatic Paint: Acrylic coating which conforms to specification outlined in AAMA 2603.

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2. Kynar: Three part coat system (primer, paint, XL). Conforms to specification outlined in AAMA 2605 to achieve the highest possible corrosion defense and protects color pigments from chalking and fading.

2.05 Infill

A. Vertical

1. Picket spacing is custom per rail dimension ensuring all picket spacing to be uniform throughout rail section.
2. Spacing is to disallow the passage of 4 inch (101.6 mm) sphere through the railing at any point.

B. Horizontal

1. Picket spacing is custom per rail dimension ensuring all picket spacing to be uniform throughout rail section.
2. Spacing is to disallow the passage of 4 inch (101.6 mm) sphere through the railing at any point.

2.06 Fasteners

- A. Handrail Anchors: Select fasteners of type, grade and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.

- B. Handrail and Railing Component Anchors: Use fasteners fabricated from same basic metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

1. Provide concealed fasteners for interconnecting railing components and for attaching them to together work, unless exposed fasteners are unavoidable or are standard fastening method for handrail and railing indicated.

2.07 Fabrication

- A. Assemble handrails and railings in shop to greatest extent possible to minimize filed splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

- B. Form changes in direction of railing members as shown in the Contract Drawings.

- C. Mechanical Connections: Fabricate handrails and railings by connecting members with railing manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

- D. Brackets, Flanges, Fittings, and Anchors: Provide the manufacturer's standard wall brackets, flanges, miscellaneous fittings to connect the handrail and railing members to other construction.

- E. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

- F. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

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- G. Cut, reinforce, drill and tap components as indicated on drawings to receive finish hardware, screws, and similar items.
- H. Close exposed ends of railing members with prefabricated end fittings.
- I. Provide mounted handrails walls returns at wall ends unless otherwise indicated. Close ends of returns, unless clearance between end railing and wall is 1/4 inch (6mm) or less.

PART 3: EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with the manufacturer's instructions
- B. Clean surfaces thoroughly with soap and water after installation is completed

3.04 PROTECTION

- A. Protect installed products until completion of project
- B. Touch-up, repair or replace damaged products before Substantial Completion

END OF SECTION

SECTION 06 1000

ROUGH CARPENTRY

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PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1. Structural dimension lumber framing.
2. Non-structural dimension lumber framing.
3. Rough opening framing for doors, windows, and roof openings.
4. Sheathing.
5. Subflooring.
6. Underlayment.
7. Roofing nailers.
8. Roofing cant strips.
9. Preservative treated wood materials.
10. Fire retardant treated wood materials.
11. Communications and electrical room mounting boards.
12. Concealed wood blocking, nailers, and supports.
13. Miscellaneous wood nailers, furring, and grounds.
14. Wall sheathing with factory applied water-resistive and air barrier sheet.

B. Refer to DSHA Standards in Div 1.

C. RELATED REQUIREMENTS

1. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.

D. REFERENCE STANDARDS

1. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.
2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
4. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
6. AWWPA U1 - Use Category System: User Specification for Treated Wood; 2012.
7. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
8. PS 20 - American Softwood Lumber Standard; 2010.
9. SPIB (GR) - Grading Rules; 2014.

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1.02 SUBMITTALS

- A. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- B. Shop Drawings: Indicate framing system, loads and cambers, bearing details, and framed openings.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- D. Certification letter from manufacturer/ treatment facility that treated lumber used on project does not contain any arsenic agents.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - 3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB), National Lumber Grades Authority (NLGA), Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
 - 1. Species: Hem-Fir. or Spruce -Pine-Fir
 - 2. Grade: No. 2.
 - 3. Surfaced four sides
- E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm)):
 - 1. Species: Any allowed under grading rules.
 - 2. Grade: No. 2. or Btr.
 - 3. Surfaced four sides
- F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:

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1. Lumber: No. 2.
2. Boards: No. 2..
3. Surfaced four sides

2.03 STRUCTURAL COMPOSITE LUMBER

- A. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.
1. Columns: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): 2,000,000 psi (13,790 MPa), minimum.
 2. Beams: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): 2,000,000 psi (13,789 MPa), minimum.
 3. Headers Not Longer Than 48 inches (1220 mm): As noted on plans. _____.
 4. Manufacturers:
 - a. Weyerhaeuser: www.weyerhaeuser.com/#sle.
 - b. Boise Cascade: www.bc.com.
 - c. Georgia-Pacific Corp.: www.buildgp.com.
 - d. Substitutions: In accordance with Contract Documents..

2.04 CONSTRUCTION PANELS

- A. Subfloor/Underlayment Combination: Any PS 1 type, rated Single Floor.
1. Bond Classification: Exterior.
 2. Span Rating: 24/16.
 3. Performance Category: 23/32 PERF CAT.
 4. Edges: Tongue and groove.
 5. Exposure 1
- B. Roof Sheathing: Any PS 1 type, rated Structural I Sheathing.
1. Bond Classification: Exterior.
 2. Span Rating: 32/16.
 3. Performance Category: 5/8 PERF CAT.
 4. Bond Classification: Exterior
- C. Wall Sheathing: Any PS 1 type.
1. Bond Classification: Exterior.
 2. Grade: APA Rated Sheathing, Exposure 1.
 3. Span Rating: 32/16 inch.
 4. Performance Category: 1/2 PERF CAT.
 5. Edge Profile: Square edge.
- D. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

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2.05 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.

B. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.

1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing per ASTM A653/A653M.

C. Sill Gasket on Top of Foundation Wall: 1/4 inch (6 mm) thick, plate width, closed cell plastic foam from continuous rolls.

D. Sill Flashing: As specified in Section 07 6200.

E. Subfloor Glue: Waterproof, air cure type, cartridge dispensed.

F. Construction Adhesives: Waterproof, air cure type, cartridge dispensed

G. Building Paper: Water resistant Kraft paper.

2.06 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:

1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Do not use treated wood in direct contact with the ground.
 - c. Do not use Treated materials that contain Arsenic.

C. Preservative Treatment:

D. Preservative Wood Treatment- ACQ

1. Manufacturers:
 - a. Chemical Specialties Inc; Preserve

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- b. Hoover Treated Wood Products Inc.; Dura-Guard
- c. Osmose; Naturewood
- d. Substitutions: In Accordance with Contract Documents
2. Wood Preservative Treatment: Urea formaldehyde free pressure treatment, AWPA C1 using water borne Alkaline Copper Quaternary (ACQ) preservative with the following minimum retention
 - a. Above Grade: 0.25 pcf.
 - b. In Contact with Grade: 0.40 pcf.
3. Shop pressure treat lumber materials indicated on Drawings
4. Kiln dry wood after treatment to maximum moisture content specified in other sections
5. Wood preservative (Surface Application): Clear type, compatible with pressure treatment.
6. Treated material shall not contain any arsenic.

PART 3 EXECUTION

3.01 PREPARATION

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.
- B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- C. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

3.03 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Install structural members full length without splices unless otherwise specifically detailed.
- C. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
- D. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches (38 mm) of bearing at each end.
- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Provide bridging at joists in excess of 8 feet (2.3 m) span as detailed. Fit solid blocking at ends of members.
- G. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

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3.04 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated and as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Stair Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Subflooring/Underlayment Combination: Glue and Screw to framing; staples are not permitted.
- B. Subflooring: Glue and Screw to framing; staples are not permitted.
- C. Underlayment: Secure to subflooring with nails and glue.
 - 1. At locations where resilient flooring will be installed, fill and sand splits, gaps, and rough areas.
 - 2. Place building paper between floor underlayment and subflooring.
- D. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. Nail panels to framing; staples are not permitted.
- E. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
 - 1. Use plywood or other acceptable structural panels at building corners, for not less than 96 inches (2440 mm), measured horizontally.
 - 2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
- F. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
 - 1. Size: 48 by 96 inches (2440 by 4880 mm), installed horizontally at ceiling height.

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3.06 TOLERANCES

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm in maximum), and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

END OF SECTION

SECTION 06 1753

SHOP-FABRICATED WOOD TRUSSES

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PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Wood roof trusses.
 - 2. Wood floor trusses.
 - 3. Wood girder trusses.

1.03 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
 - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 - 2. Indicate sizes, stress grades, and species of lumber.
 - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 - 6. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.04 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Metal-plate connectors.
 - 2. Metal truss accessories.

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1.05 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.02 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
- B. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry"

2.03 METAL CONNECTOR PLATES

- A. Manufacturers:
 - 1. Alpine, an ITW Company

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2. Cherokee Metal Products, Inc.
3. Eagle Metal Products
4. MiTek Industries, Inc.
5. Simpson Strong-Tie Co., Inc.

- B. General: Fabricate connector plates to comply with TPI 1
- C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M Structural Steel (SS) high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

2.04 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
 2. Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.

2.05 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Manufacturers:
1. Alpine, an ITW Company
 2. Cherokee Metal Products, Inc.
 3. Eagle Metal Products
 4. MiTek Industries, Inc.
 5. Simpson Strong-Tie Co., Inc.
- B. Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

2.06 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1.
1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

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PART 3 EXECUTION

3.01 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Section 061000 "Rough Carpentry".
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- H. Install wood trusses within installation tolerances in TPI 1.
- I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- J. Replace wood trusses that are damaged or do not comply with requirements.

END OF SECTION

SECTION 06 2000

FINISH CARPENTRY

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PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Interior finish carpentry items.
 - a. Wood standing and running trim.
 - b. Wood casings and moldings, base, window sills and aprons.
 - 1) Exterior finish carpentry items:
 - a) Wood trim.
 - 1 Exterior molded trim, moldings and brackets.
 - 2 Exterior door frames.
 - 3 Exterior decking.
 - 4 Lattice.

1.02 SUBMITTALS

A. Shop Drawings:

1. Indicate materials, dimensions, component profiles, fastening methods, jointing details, and accessories. Indicate to minimum scale of 1-1/2 inch to 1 foot.
2. Complete shop drawings of exterior FrameSaver frame installation methods.
 - a. Product Data: All manufactured products as specified in this section.
 - b. Samples: Two samples of each type trim, fascia, exterior frames, decking, lattice, etc.
 - 1) inches long by actual width, and profile.
3. Certification: Submit copy of fabricator's authorization to use AWI Grade Stamps.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Quality Standards, Custom Grade.
- B. Prepare Shop Drawings for handrails under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the state where project is located.

1.04 QUALIFICATIONS

- A. Fabricator: Authorized to use AWI Grade Stamps.
- B. Fabricator: Company specializing in fabricating Products specified in this section with minimum three years documented experience.

1.05 PRE-INSTALLATION MEETING

- A. Convene minimum one week prior to commencing Work of this section.

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1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.

1.07 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.08 SEQUENCING

- A. Sequence work to ensure utility connections are achieved in orderly and expeditious manner.

1.09 COORDINATION

- A. Coordinate work with installation of associated and adjacent components, and finishes.

1.10 WARRANTY

- A. Exterior Decking: Manufacturers standard limited warranty, minimum 20 years, against fading, staining, delamination, under normal conditions.

PART 2 PRODUCTS

2.01 COMPONENTS

- A. Hardwood Lumber: AWI Grade II custom; closed grain species; maximum moisture content of 8 percent; suitable for opaque finish.
- B. Softwood Lumber: PS 20; Graded in accordance with AWI Grade III; clear white pine
 - 1. species, maximum moisture content of 6 percent; suitable for opaque finish.
 - 2. All units to receive new window sill/apron and base trim. Trim to be finger joint pine or poplar.
 - a. 2-1/4 inch colonial trim at window apron.
 - b. 3-1/4 inch base trim with ogee top for residential units.
 - c. 5-1/4 inch base trim with ogee top for community building and common spaces.
 - 3. Provide shoe moldings at all vinyl and VCT floors, unless indicated otherwise.

2.02 EXTERIOR MOLDED TRIM, MOLDINGS, BRACKETS

- A. Manufacturers:
 - 1. Azek.
 - 2. Fypon.
 - 3. Substitutions: In accordance with Contract Documents.
- B. Plastic fabrications, molded polyurethane, UV resistant, factory primed for field applied paints; profiles as indicated on Drawings.

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2.03 EXTERIOR DOOR FRAMES

- A. Manufacturer:
 - 1. Endura Products, Inc., FrameSaver Series.
 - 2. Substitutions: In accordance with Contract Documents.
- B. Rot Resistant Frame: Prehung jamb and head, milled from 5/4 kiln-dried pine, finger joints are permitted, with jambs featuring finger jointed composite ends.
 - 1. Provide manufacturers standard lifetime warranty against rot and insect damage.
- C. Frame configuration indicated on Drawings as approved by Owner.
- D. Prime frames at factory.

2.04 EXTERIOR DECKING

- A. Manufacturer:
 - 1. Tamko, EverGrain Envision; Basis of Design
 - 2. Substitutions: In accordance with Contract Documents.
- B. Wood Decking/Skirting: Composite type decking and skirting with deep wood grain texture, prefinished.
 - 1. Size: Nominal 1 x 6 inches unless otherwise indicated on Drawings.
 - 2. Board edge configuration as selected.
 - 3. Colors: Cape Cod Grey.
- C. Fasteners: Type recommended by decking manufacturer for application.

2.05 ACCESSORIES

- A. Fasteners: Of size and type to suit application; galvanized steel finish in concealed locations and finish as selected in exposed locations.
- B. Concealed Joint Fasteners: Threaded steel.
- C. Lumber for Shimming and Blocking: As specified in Section 06100.
- D. Wood Filler: Water base type.
- E. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- F. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is
- G. recommended for indicated use by adhesive manufacturer.

2.06 FABRICATION

- A. Fabricate to AWI Custom standards.
- B. Door Frames:

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1. Fabricate swing door frames from solid lumber with applied stops and lapped joints for field assembly.
 2. Factory machine jambs for hinge and strike preparation. Coordinate with sections associated with hardware types and locations.
 3. Doors to the exterior have "Frame Savers"
- C. Shop assemble work for delivery to site, permitting passage through building openings.
1. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

2.07 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler matching surrounding surfaces and of types recommended for applied finishes.
- D. Seal internal surfaces and semi-concealed surfaces

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated on approved shop drawings.
- B. Verify adequacy of backing and support framing.
- C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 PREPARATION

- A. Prime paint surfaces of items or assemblies in contact with cementitious materials in accordance with Section 09900, before installation.
- B. Back prime interior window sills and widow trim items scheduled for paint finish in accordance with Section 09900, before installation.

3.03 INSTALLATION - GENERAL

- A. Install work in accordance with AWI Custom quality standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components and trim with nails at 16 inches on center.
- E. Miter running joints and external corners. Cope internal corners.

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- F. Install molded trim, moldings, brackets, etc in accordance with manufacturer's instructions.
- G. Preparation for Site Finishing: Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- H. Install exterior FrameSaver frames where indicated on drawings and in accordance with approved shop drawings.
- I. Site Finishing: Refer to Section 09900.
- J. Lattice: Install in accordance with manufacturer's recommendations at locations indicated on the drawings.

3.04 EXTERIOR DECKING

- A. Install wood decking in accordance with manufacturer's instructions.
- B. Install decking in single piece for full length wherever possible.
- C. Align decking with uniform open joints, width as recommended by manufacturer.
- D. Stagger end joints minimum 16 inches between adjacent deck boards.

3.05 ERECTION TOLERANCES

- A. Maximum Variation from Indicated Position: 1/16 inch.
- B. Maximum Offset from Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06 2001

CARPENTRY AND WOOD RESTORATION

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CARPENTRY

PART 1 - GENERAL

- 2.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:
- A. Building #16
 - 1. Install window head flashing at wood siding above window.
 - 2. Replace deteriorated wood head molding; epoxy consolidate and dutchman repair wood jamb moldings at certain windows in metal siding.
 - 3. Supplement incomplete nailing at cornice; fill existing nail holes at siding.
 - 4. Reconstruct 2 deteriorated or damaged wood sills, to match existing decorative profiles. Replace missing fascia medallion, to match existing.
 - 5. Affect repairs to wooden porch components, as noted.
 - B. Building #18:
 - 1. Restore woodwork; supplement with dutchman repairs at doors and windows; restore miscellaneous woodwork at fascias and cornices.
 - 2. Repair and restore wood siding and at woodwork at south gable façade; install new trim board and flashing connection to roof (of Building 20).
 - C. Building #20:
 - 1. Restore woodwork; supplement with dutchman repairs at doors and windows; restore miscellaneous woodwork at fascias, dentils and crown moldings at east cornice.
 - 2. Affect repairs to wooden porch components, as noted.
 - 3. Repair, replace and restore existing woodwork at dormers faces including new trim boards, wall sheathing and ship-lapped siding per details, with flashing connection to roof.
 - 4. Affect repairs to wooden porch components, as noted and detailed.
 - 5. Repair existing shutters and fabricate new to match per elevations.
 - D. Building #22
 - 1. Restore woodwork; supplement with dutchman repairs at doors and windows; and window sills at front and side elevations.
 - 2. Affect repairs to wooden porch components, as noted and detailed.
 - 3. Install replacement matching wood soffits, fascias, and corbels at east elevation (following roof repairs).
 - E. Building #24
 - 1. Remove and replace previously altered garret window sill with materials to match 2 other originals.
 - 2. Repair blemishes in entry door, transom unit and wood surround.

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3. Support brick, remove and replace deteriorated wood lintels and jambs, with preservative treated matching sizes, at basement window openings.
4. Remove rotted wood at rear storage door jambs, install dutchman repairs & epoxy consolidation.

F. Building #26

1. Remove rotted top cap of woodwork over brick arch in fire alley & replace with naturally durable or preservative treated wood with flashing.
2. Remove rotted wood at front entry door and jamb sidelight panels; install dutchman repairs and epoxy consolidation.
3. Support brick, remove and replace deteriorated wood lintels and jambs, with preservative treated matching sizes, at basement window openings.

G. Storage Shed

1. At previously altered north elevation, remove entire clapboarding, reframe studs and header for new roll-up door. Install sheathing at entire wall, reinstall clapboard siding over tar paper, supplementing clapboards in kind, with new corner boards.
2. Repair / reinforce floor joists per drawings and details in structural section.

2.02 STANDARDS:

A. Standards of the following associates and current publications shall apply to materials furnished under this section:

1. ASTM D-245; American Society for Testing and materials (ASTM) Philadelphia, PA (215) 299-5585.
2. Western Wood Products Association.
3. Southern Pine Inspection Bureau.
4. American Plywood Association (APA).

2.03 SAMPLES & SUBMITTALS:

A. Samples: The Contractor shall submit the following samples:

1. Samples of proposed supplemental and replacement wood siding, fascias and moldings: two (2) 18" lengths.
2. Samples of proposed replacement barge boards, porch ribbons and other facings, two (2) 24" lengths by at least nine (9)" width.
3. Samples of pressure-treated wood for miscellaneous use, with stamp or tag evident: two (2) 18" lengths.
4. Samples of supplemental plywood sheathing (thickness per stud-span rating): two (2) twelve inch (12") by twelve inch (12") pieces bearing the label of the approval agency.
5. Naturally durable woods for porch floor decking.
6. Proposed Nails and screws for each condition (common and finish nails): three (3) samples of each proposed size and materials (hot-dipped galvanized and stainless steel).

B. Submittals: The Contractor shall submit the following:

1. Manufacturer's literature for any proposed pre-fabricated porch woodwork: structural columns, railing systems, stair newels, railings and balusters. Architect will select from the full range of profiles available.
2. Available material choices, colors, finishes, and warranties for all proposed products.

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2.04 QUALITY ASSURANCE:

- A. The Contractor performing the work of this Section shall have a minimum of ten years experience in the repair and restoration of wood-framed historic structures and shall have completed at least three projects of similar scale within the previous five years.
- B. Use skilled workers who are trained and experienced especially in proper techniques of re-alignment of existing deflected structures, and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this section.

2.05 DELIVERY, STORAGE AND HANDING OF MATERIALS:

- A. New woodwork, siding, sheathing and fascia materials shall be delivered to the site and stored in such a manner as to keep them clean and dry, and not interfere with the daily maintenance and operation of the site. Proposed material storage locations shall be approved by the Owner prior to delivery of materials.

PART 2 - PRODUCTS & MATERIALS

3.01 MATERIALS:

- A. Supplemental Wall Sheathing:
 - 1. New wall sheathing (at Dormer Walls & Storage Shed) shall be nominal 5/8" thickness plywood (not OSB) to span existing and new framing. APA rated, minimum 4 ply, exterior adhesive, plywood in 4 ft. x 8 ft. sheets.
 - 2. Install with hot-dipped galvanized nails or #6 galvanized deck screws, of appropriate size for the work.
- B. Replacement Porch Flooring, Wood Siding and Running Trim:
 - 1. New wood siding and trim shall match existing in thickness, exposure, profile and detail. Trim shall be full 1" thick boards (or match existing) by widths to match existing (4" to 6" corner board widths), dependent upon the Building and location. Acceptable woods are well seasoned or kiln dried (minimum KD19), No. 2 grade or better, Alaskan (white) Cedar, Western (red) Cedar, Southern Yellow Pine (long-leaf pine) or Cypress.
 - 2. Synthetic & man-made wood-like materials may be used only if approved by the Dover Historical Commission and Delaware State SHPO, for specific-use areas.
 - 3. Flashing shall be as specified in Section 07600 - Metal & Membrane Roofing & Accessories.
- C. Water-Repellent Preservative Treatment by Non-pressure Process: AWWA-N1.
 - 1. Preservative Chemicals: 3-iodo-2-propynyl butyl carbonate (IPBC), combined with an insecticide containing chloropyrifos.
 - 2. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
 - 3. Application: Wood framing at porch floor structures.
- D. Special Fasteners:

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1. Replica antique cut nails with hand-made heads, (if necessary) black coated per Tremont Nail Company, Mansfield MA; 800-835-0121.
2. Common and Finish Nails for fastening shall be minimum 8d corrosion resistant, hot dipped galvanized steel, stainless steel, or Monel steel.

PART 3 - EXECUTION

4.01 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
- C. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
- D. Install stairs with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and with no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.
- E. Coordinate finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate finish carpentry.

4.02 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- B. Match color and grain pattern across joints.
- C. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.
- D. Fit exterior joints to exclude water. Apply flat grain lumber with bark side exposed to weather.

4.03 SIDING INSTALLATION

- A. Horizontal Lumber Siding: Apply starter strip along bottom edge of sheathing or sill. Install first course of siding with lower edge at least 1/8 inch (3 mm) below starter strip and subsequent courses lapped 1 inch (25 mm) over course below. Nail at each stud. Do not allow nails to penetrate more than one thickness of siding.

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- B. Leave 1/8-inch (3-mm) gap at trim and corners, unless otherwise recommended by manufacturer, and apply sealant.
- C. Butt joints only over framing or blocking, nailing top and bottom on each side and staggering joints in subsequent courses.
- D. Seal butt joints at inside and outside corners and at trim locations.
- E. Conceal fasteners to greatest practical extent by countersinking and filling, by placing in grooves of siding pattern, or by concealing with applied trim or battens as detailed. Do not nail through overlapping pieces.
- F. Seal butt joints at inside and outside corners and at trim locations.
- G. Finish: Apply finish within two weeks of installation.

4.04 CLEANING

- A. Clean carpentry surfaces on exposed and semi-exposed surfaces. If finish and appearance of new materials does not match the existing, then apply bleaching oil stain to accelerate the aging of newly installed wood members (see Section 09900 - Painting & Coatings).

4.05 COMPLETION

- A. Replace carpentry that is damaged or does not comply with requirements. Carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

WOOD RESTORATION

PART 1 - GENERAL

5.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:

- A. Consolidation and filling of deteriorated wood where applicable. Due to the historic nature of the buildings, preservation of original materials is of great importance. Where deterioration is confined to small isolated areas, epoxy consolidation should be performed in lieu of replacement of the affected member, especially if members are determined to be original materials in the judgment of the Architect.
- B. Dutchman patching (selective partial replacement) of deteriorated wood.

5.02 RELATED SECTIONS

- A. Section 06200 - Carpentry
- B. Section 07900 - Sealants.
- C. Section 09900 - Painting and Finishing.

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D. Section 08200 - Window and Door Restoration

E. Section 09900 - Painting & Coatings

5.03 REFERENCES

A. Technical Preservation Brief #45, Preserving Historic Wooden Porches, National Park Service, U.S. Department of the Interior, October 2006; (Sections on maintenance, repair and replacement of wood).

5.04 SUBMITTALS

A. Product Literature: Submit manufacturer's product literature for all proprietary epoxy consolidation and patching materials to be used in restoration of deteriorated wood. Product literature shall include technical specifications, instructions for application and use and Material Safety Data Sheets.

B. Two (2) six-inch samples of proposed wood for Dutchman repairs.

5.05 QUALITY ASSURANCE

A. The Contractor performing the work of this Section shall have been engaged in the practice of restoration carpentry for a minimum of ten (10) years, including work on at least three (3) buildings listed in the National Register of Historic Places. The Contractor shall furnish a minimum of three (3) references for projects of similar scope of work completed within the last five (5) years at the time of the bid.

5.06 DELIVERY, STORAGE AND HANDLING

A. Store epoxy-based wood consolidants and fillers indoors in a cool, dry location away from direct sunlight. Ensure that products remain stored and used within the temperature range specified by the manufacturer.

B. Do not store associated solvents on site.

C. Store wood materials for Dutchman patching indoors and protect from moisture and damage.

5.07 PROJECT / SITE CONDITIONS

A. The Contractor is responsible for protecting existing adjacent materials during the execution of the work. Provide all necessary protection and work procedures to avoid damage to existing material assemblies not a part of the work of this Section. At a minimum, the Contractor shall:

1. Protect adjacent masonry, stucco, glass and surrounding surfaces in work areas from epoxy drips and spatters during wood consolidation. Remove furnishings from the immediate work area.

B. Dispose of unused resin materials on a daily basis.

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PART 2 - PRODUCTS

6.01 WOOD RESTORATION MATERIALS

- A. Epoxy: Epoxy consolidant and fillers shall be the types with regular and proven use for consolidation of decayed wood. Consolidant shall have low viscosity and be slow setting to allow for successive applications. When fully cured, epoxy shall be more flexible than wood at temperatures of 50 degrees to 100 degrees Fahrenheit range. Provide one of the following:
1. "Flexible Epoxy Consolidant 100"; ConServe Epoxy, LLC, P.O. Box 454, Northford, CT 06472; 203-484-4123.
<http://conservepoxy.com/mm5/merchant.mvc?Screen=PLST>
 2. "Liquid Wood"; Abatron, Inc., 5501 - 95th Avenue, Kenosha WI 53144; 800-445-1754; 262-653-2000. www.abatron.com/product/wood-restoration-kit/
 3. "West System"; Gougeon Brothers, Bay City, MI; 866-937-8797.
<https://www.westsystem.com/products/>
 4. Sika Corporation U.S., Lyndhurst, NJ; 1-800-933-SIKA. <https://usa.sika.com/>
 5. Architect approved equal.
- B. Adhesives and Fillers:
1. Wood Glue: Water activated polyurethane glue (Gorilla Glue) as manufactured by the Gorilla Glue Company, Cincinnati, OH; 1-800-966-3458.
<https://www.gorillatough.com/products/>
 2. Epoxy filler for consolidated woodwork to be painted: Non-shrinking, moisture resistant, paintable epoxy wood filler such as "Flexible Epoxy Patch" from ConServ Epoxy, LLC or "WoodEpoxy" from Abatron; or Architect approved equal.

6.02 WOOD DUTCHMAN MATERIALS

- A. Restoration: Species of repair material shall match the existing component to be restored/repared (most frequently white oak). Lumber shall be graded in accordance with the current edition of the AWI Quality Standards, Grade III unless indicated otherwise.
- B. Moisture content:
1. Not to exceed 15% for trim, siding and millwork 4 inches or less in thickness.
 2. Not to exceed 19% for wood framing lumber 4 inches or greater in thickness.
- C. Grading:
1. NHPMA Official Grading Rules, 1978: All species, B and better Select.
 2. WCLIB Standard Grading and Dressing Rules, 1984: All species, C and better VG.
 3. NHLA Grading Rules, First Grade unless otherwise indicated.

6.03 MAN-MADE MATERIALS

- A. Provide composite and / or synthetic wood materials, where allowable, from one of the following manufacturers:
1. Trade name here, by manufacturer name here, address, city, contact phone number 000-000-0000.

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2. Trade name here, by manufacturer name here, address, city, contact phone number
000-000-0000.
3. Trade name here, by manufacturer name here, address, city, contact phone number
000-000-0000.

PART 3 - EXECUTION

7.01 EPOXY CONSOLIDATION

- A. Where major components exhibit moderate, localized deterioration, epoxy consolidation may be used in lieu of replacement to maximize the retention of original material. Heavily weathered but still sound exterior surfaces shall also be consolidated prior to filling and painting.
- B. Remove paint down to bare wood. In deteriorated areas, all loose and soft wood decay must be removed prior to application of epoxy consolidant. Attempt to remove decay down to good wood. If not visible, 3/16-inch holes may be drilled at 2 inches o.c. approximately for better epoxy penetration. Remove all loose fragments and blow-out or vacuum-up all dust.
- C. Protect decayed area from moisture until consolidant has been applied and has completely set. Wood to be consolidated must be dry and have a moisture content of less than 19 percent within 3 inches of the decay area.
- D. Apply liberally to prepared decay area by pouring, brushing or spraying. Do not allow consolidant to touch adjacent areas, materials or building components. Repeat application 4 to 6 times, or until surfaces cannot accept more epoxy. Allow 1 hour between applications.
- E. Keep epoxy consolidant out of direct sunlight at temperatures above 60 degrees Fahrenheit until fully cured.

7.02 EPOXY PATCHING

- A. Consolidate deteriorated woodwork with epoxy, which has been approved by the Architect, prior to performing any patching work.
- B. Protect all finish surfaces from damaging spills or drips. Immediately remove any spills or drips using solvent as recommended by the manufacturer.
- C. Prime decayed surfaces according to manufacturer's instructions. Epoxy may be applied by brush or trowel. Saturate the treatment area for a minimum of 1 hour.
- D. The epoxy filler may be contained during the curing process by constructing temporary forms or molds. Use manufacturer's recommended mold release agent. Potters clay may be used to seal small openings or checks.
- E. Fill open grain on heavily weathered surfaces, working filler full depth into checks and crevices. Scrape or sand filed areas back to match the surrounding surface.
- F. Tool, shave or otherwise shape installed patching material as required to match the surface of the surrounding material with no variation in profile and flushness.
- G. Protect treatment areas from moisture until all epoxy has cured.

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- H. Following application, leave all areas clean and free of epoxy. Discard unused epoxy, containers, tools and debris in accordance with local, state and federal environmental regulations.
- I. Allow epoxy to cure a minimum of 48 hours at temperatures above 60 degrees Fahrenheit, or for 72 hours at temperatures in the 50 degrees Fahrenheit range. Keep epoxy out of direct sunlight at temperatures above 60 degrees Fahrenheit.

7.03 DUTCHMAN PATCHING

- A. Cut out areas of deteriorated wood down to sound material, leaving mating surfaces smooth and flat for installation of wood Dutchman materials. Square off areas to receive patches.
- B. The grain of Dutchman material shall align with the grain of member to be patched. Dutchman patches shall fit snugly on all sides, leaving only hairline gaps. Affix patches with wood glue or finish nails depending on the size and location of patch.
- C. Where entire ends of wood members must be replaced, new Dutchman material shall be dowelled into original fabric, leaving no variation in surface plane or edges. Diameter of the wood dowels shall be no greater than 1/3 the thickness of the wood pieces to be joined.
- D. Dowels shall extend a minimum of 3 inches into both the old and new wood. Where conditions permit, dowelled connections may be reinforced with wood cleats on concealed face.

END OF SECTION

SECTION 07 0150.19

PREPARATION FOR RE-ROOFING

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Replacement of existing roofing system in preparation for new roofing system in designated areas as indicated on drawings.
- B. Partial replacement of existing roofing system in preparation for replacement roofing system in designated areas as indicated on drawings.
- C. Temporary roofing protection.

1.02 SUBMITTALS

- A. Product Data: Submit for each type of material.

1.03 QUALITY ASSURANCE

- A. Materials Removal Company Qualifications: Company specializing in performing work of type specified with at least three years of documented experience.
 - 1. Comply with EPA notification regulations prior to start of roofing removal work.
 - 2. Comply with removal and disposal regulations of local authorities having jurisdiction (AHJ).
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

1.05 FIELD CONDITIONS

- A. Existing Roofing System: EPDM single-ply roofing.
- B. Existing Roofing System: Built-up asphalt roofing.
- C. Do not remove existing roofing membrane when weather conditions threaten the integrity of building contents or intended continued occupancy.
- D. Maintain continuous temporary protection prior to and during installation of new roofing system.
- E. Provide notice at least three days before starting activities that will affect normal building operations.

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- F. Verify that occupants have been evacuated from building areas where work on structurally impaired roof decking is scheduled to begin.
- G. Owner will occupy building areas directly below re-roofing area.
 - 1. Do not disrupt Owner's operations or activities.

1.06 WARRANTY

- A. Existing Warranties: Perform this work using methods and materials that will maintain existing roof system warranties.
 - 1. Notify existing roof system warrantor prior to starting this work and obtain written instructions for procedures necessary to maintain this existing warranty.
 - 2. Upon completion of this work, notify warrantor of reroofing completion and obtain documentation to verify that existing roofing system has been inspected and warranty is still in effect.
 - a. Submit documentation upon project closeout.

PART 2 PRODUCTS

2.01 COMPONENTS

- A. Refer to following sections for additional information on components relating to this work:
 - 1. Partial removal of existing roofing system in preparation for new roofing system in designated areas as indicated on drawings, refer to Section 07 5100.

2.02 MATERIALS

- A. Patching Materials: Provide necessary materials in accordance with requirements of existing roofing system.
- B. Temporary Roofing Protection Materials:
 - 1. Contractor's responsibility to select appropriate materials for temporary protection of roofing areas as determined necessary for this work.

2.03 ACCESSORIES

- A. Fasteners: Type and size as required and compatible with existing and new roofing system to resist local wind uplift.
- B. Sheathing Paper: Red rosin paper type, at least 3 lbs per 100 sq ft (141 grams per sq m).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing roof surface has been cleared of materials being removed from existing roofing system and ready for next phase of work as required.

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3.02 PREPARATION

- A. Sweep roof surface clean of loose matter.
- B. Remove loose refuse and dispose of properly off-site.

3.03 MATERIAL REMOVAL

- A. Remove only existing roofing materials that can be replaced with new materials the same day.
- B. Scrape roofing gravel from membrane surface without causing serious damage to membrane felts.
- C. Remove damaged portions of roofing membrane, perimeter base flashings, flashings around roof protrusions, pitch pans and pockets.
- D. Cut and lay flat any membrane blisters.
- E. Remove damaged insulation and fasteners, cant strips, blocking.

3.04 INSTALLATION

3.05 PROTECTION

- A. Provide protection of existing roofing system that is not having work performed on it.
- B. Provide temporary protective sheeting over uncovered deck surfaces.
- C. Turn sheeting up and over parapets and curbing. Retain sheeting in position with weights.
- D. Provide for surface drainage from sheeting to existing drainage facilities.
- E. Do not permit traffic over unprotected or repaired deck surface.
- F. Install recover board over existing membrane.

END OF SECTION

SECTION 07 2100

THERMAL INSULATION

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Batt insulation and vapor retarder in exterior wall, ceiling, and floor construction.
- B. Refer to DSHA Standards in Division 1

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Insulation:
 - 1. CertainTeed Corp;
 - 2. Johns Manville;
 - 3. Owens Corning;
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 APPLICATIONS

- A. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.

2.03 BATT INSULATION MATERIALS

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
 - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 4. Formaldehyde Content: Zero.
 - 5. Thermal Resistance: as indicated on drawings.

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6. Batt Insulation (Type 1) Facing on concealed insulation. Kraft faced paper faced one side
7. Batt Insulation (Type 2) Facing on exposed insulation. Aluminum foil, flame spread 25 rated; one side.
8. Manufacturers:
 - a. CertainTeed Corporation: CertaPro Commercial AcoustaTherm Batts
www.certainteed.com.
 - b. Johns Manville: Formaldehyde-free Fiber Glass Insulation www.jm.com.
 - c. Owens Corning Corporation; Thermal Batt FIBERGLAS Insulation:
www.ocbuildingspec.com.
9. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- F. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches (150 mm) on center. Lap and seal sheet retarder joints over member face.

3.03 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2123

LOOSE-FILL INSULATION

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PART 2 PRODUCTS

1.01 MATERIALS

1.02 APPLICATIONS

- A. Provide loose-fill insulation in the following application(s) as indicated on drawings:

END OF SECTION

SECTION 07 2500

WEATHERPROOF BARRIERS

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PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Stucco Wrap barrier membrane (DuPont™ Tyvek® StuccoWrap®)
- B. Weather barrier membrane (DuPont™ Tyvek®)
- C. Seam Tape (DuPont™ Tyvek® Tape)
- D. Flashing (DuPont™ FlexWrap™, DuPont™ FlexWrap™ NF, DuPont™ StraightFlash™, DuPont™ StraightFlash™ VF, and/or DuPont™ Thru-Wall Flashing)
- E. Fasteners (DuPont™ Tyvek® Wrap Caps)

1.02 SUBMITTALS

- A. Refer to Section 01 33 00 Submittal Procedures .
- B. Product Data: Submit manufacturer current technical literature for each component.
- C. Samples: Weather Barrier membrane, minimum 8-1/2 inches by 11 inch.
- D. Quality Assurance Submittals
 - 1. Manufacturer Instructions: Provide manufacturer’s written installation instructions.
- E. Closeout Submittals
 - 1. Refer to Section 01 78 00 Closeout Submittals.

1.03 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer shall have experience with installation of similar weather barrier assemblies under similar conditions.
 - 2. Installation shall be in accordance with manufacturer’s installation guidelines and recommendations.
 - 3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01 60 00 Product Requirements.
- B. Deliver weather barrier materials and components in manufacturer’s original, unopened, undamaged containers with identification labels intact.
- C. Store weather barrier materials as recommended by system manufacturer.

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1.05 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. DuPont Building Innovations; 4417 Lancaster Pike, Chestnut Run Plaza 721, Wilmington, DE 19805;
- B. 1-800-44-TYVEK (8-9835); <http://www.construction.TYVEK.com>

2.02 MATERIALS

- A. Basis of Design: Textured, spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® StuccoWrap® and related assembly components.
- B. Performance Characteristics:
1. Air Penetration: 0.004 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
 2. Water Vapor Transmission: 50 perms, when tested in accordance with ASTM E96, Method B.
 3. Water Penetration Resistance: 210 cm when tested in accordance with AATCC Test Method 127.
 4. Basis Weight: 2.1 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 5. Air Resistance: 300 seconds, when tested in accordance with TAPPI Test Method T-460.
 6. Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882, Method A.
 7. Tear Resistance: 7/9 lbs, when tested in accordance with ASTM D1117.
 8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 5, Smoke Developed: 25

2.03 ACCESSORIES

- A. Seam Tape: 2 or 3 inch wide, DuPont™ Tyvek® Tape as manufactured by DuPont Building Innovations.
- B. Fasteners:
1. Tyvek® Wrap Caps, as manufactured by DuPont Building Innovations: #4 nails with large 1-inch plastic cap fasteners or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
- C. Sealants
1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 2. Products:

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- a. DuPont Residential Sealant
- b. DuPont Commercial Sealant
- c. Sealants recommended by the weather barrier manufacturer.

D. Adhesive:

1. Provide adhesive recommended by weather barrier manufacturer.
2. Products:
 - a. Liquid Nails® LN-109
 - b. Denso Butyl Liquid
 - c. 3M High Strength 90
 - d. SIA 655
 - e. Adhesives recommend by the weather barrier manufacturer.

E. Primer:

1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
2. Products:
 - a. 3M High Strength 90
 - b. Denso Butyl Spray
 - c. SIA 655
 - d. Permagrip 105
 - e. ITW TACC Sta' Put SPH
 - f. Primers recommended by the flashing manufacturer

F. Flashing

1. DuPont™ FlexWrap™, as manufactured by DuPont Building Innovations: flexible membrane flashing materials for window openings and penetrations.
2. Preformed Inside and Outside Corners and End Dams as manufactured by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 INSTALLATION – STUCCO WRAP OVER WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- C. Apply wrap with grooved surface pattern in vertical direction.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface. Maintain weather barrier plumb and level

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- E. Shingle weather barrier over back edge of weep screed. Seal weather barrier with sealant or tape to weep screed. Ensure weeps are not blocked.
- F. Subsequent layers shall overlap lower layers a minimum of 6 inches horizontally in a shingling manner.
- G. Window and Door Openings: Extend weather barrier completely over openings.
- H. Weather Barrier Attachment:
 - 1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- I. Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

3.03 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION (FOR USE WITH FLANGED WINDOWS)

- A. Cut weather barrier in an “-cut” pattern. A modified -cut is also acceptable.
 - 1. Cut weather barrier horizontally along the bottom and top of the window opening.
 - 2. From the top center of the window opening, cut weather barrier vertically down to the sill.
 - 3. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier membrane at window head to expose 8 inches of sheathing. Temporarily secure weather barrier membrane flap away from sheathing with tape.

3.05 FLASHING (FOR USE WITH FLANGED WINDOWS)

- A. Cut [7-inch] [9-inch] wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. . Mechanical fastening is not required for DuPont™ FlexWrap™ NF.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

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- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193.

3.06 PROTECTION

- A. Protect installed weather barrier from damage.

END OF SECTION

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SECTION 07 3113

ASPHALT SHINGLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Asphalt shingle roofing.
- B. Flexible sheet membranes for eave protection, underlayment, and valley protection.
- C. Ridge vents
- D. Associated metal flashings and accessories.
- E. Refer to DSHA Standards in Division 1

1.02 SUBMITTALS

- A. Product Data: Provide data indicating material characteristics, performance criteria, and limitations.
- B. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color selection.
- C. Manufacturer's Installation Instructions: Indicate installation criteria and procedures.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.03 QUALITY ASSURANCE

- A. Perform Work in accordance with the recommendations of NRCA Steep Roofing Manual.
 - 1. Maintain one copy of document on site.
- B. Products Required to Comply with Fire Resistance Criteria: UL listed and labeled.

1.04 Delivery, Storage, and Handling

- A. Store roofing materials in a dry well-ventilated, weathertite location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.
 - 1. Exterior Fire-Test Exposure: Class A; ASTN E 108 or UL 790, for application and roof slopes indicated.
- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

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1.05 FIELD CONDITIONS

- A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F (7 degrees C).
- B. Environmental Limitations: Do not deliver or install asphalt shingles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.06 Warranty

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fall within specified warranty period.
- B. Failures include, but are not limited to, the following:
 - 1. Manufacturer's defects
 - 2. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.
- C. Material Warranty Period: 30 years from date of Substantial Completion, non prorated.
- D. Wind-Speed Warranty Period: asphalt shingles will resist blow-off or damage caused by windspeeds up to 110 mph for 10 years from date of Substantial Completion.
- E. Algea-Discoloration Warranty Period: Asphalt shingles will not discolor for 10 years from Date of Substantial Completion.

1.07 Extra Materials

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with the labels describing contents.
 - 1. Asphalt shingles: 100 sq. ft. of each type, in unbroken bundles.

PART 2 PRODUCTS

2.01 SHINGLES

- A. Manufacturers:
 - 1. GAF; Timberline Cool Series: www.gaf.com/#sle.
 - 2. Owens Corning Corp: www.owenscorning.com.
 - 3. Certainteed; Product Landmark.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

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2.02 ASPHALT SHINGLES

- A. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462/D3642M; Class A fire resistance.
1. Wind Resistance: Class F, when tested in accordance with ASTM D5161/D3161M.
 2. Warranted Wind Speed: Not less than tested wind resistance. Meet applicable wind speed from building codes.
 3. Algae Resistant: Granules treated to resist algae discoloration.
 4. Weight: 95 lb/100 sq ft (4.6 kg/sq m).
 5. Self-sealing type.
 6. Color: As selected from manufacturer's full color range..
 7. Ridge Shingles: Factory pre-cut units to match shingles.

2.03 SHEET MATERIALS

- A. Underlayment: Self-adhering rubber-modified asphalt sheet complying with ASTM D1970; 40 mil (1.02 mm) total thickness; with strippable release film and woven polypropylene sheet top surface.
1. Minimum Requirements: Comply with requirements of ICC-ES AC188 for non-self-adhesive sheet.
 2. Self Sealability: Passing nail sealability test specified in ASTM D1970.
 3. Low Temperature Flexibility: Unaffected at -20 degrees F, Passing test specified in ASTM D1970/D1970M.
 4. Water Vapor Permeance: 0.05 perms (2.9 ng/(Pa s sq m)), when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 5. Liquid Water Transmission: Passes ASTM D4869/D4869M.
 6. Functional Temperature Range: Minus 70 degrees F (56.7 C) to 212 degrees F (100 C).
- B. Underlayment: Asphalt-saturated organic roofing felt, unperforated, complying with ASTM D226/D226M, Type II ("No.30").

2.04 Ridge Vents

- A. Ridge Vents: Plastic, normal 12" wide with vent openings that do not permit direct water or weather entry; to receive cap shingles; minimum 12 square inches net free area per foot length.
- B. Starter and End Caps: As required to suit application.
- C. Manufacturers:
1. GAF; Cobra Rigid Vent II
 2. Cor-A-Vent Inc.; V300 Series
 3. CertainTeed Air Vent Inc; Shingle Vent II
 4. Mid-America Building Products; RidgeMaster and HipMaster
 5. Celotex; Roll Vent
 6. Substitutions: In accordance with Contract Documents

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2.05 ACCESSORIES

- A. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, 10 wire gage, 0.1019 inch (2.59 mm) shank diameter, 3/8 inch (9.5 mm) head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch (19 mm) into roof sheathing or decking.
- B. Plastic Cement: ASTM D4586/D4568M, Asphalt type with mineral filler components, free of toxic solvents, capable of setting within 24 hours at temperatures of 75 degrees F and 50 percent RH.
- C. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents.
- D. Sustrate Filler: Latex type.

2.06 METAL FLASHINGS

- A. Metal Flashings: Provide sheet metal eave edge, gable edge, ridge, ridge vents, and other flashing indicated. Drip edge to be "F" type.
 - 1. Form flashings to protect roofing materials from physical damage and shed water.
 - 2. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
 - 3. Hem exposed edges of flashings minimum 1/4 inch (6 mm) on underside.
- B. Steel Sheet Metal: Prefinished and galvanized steel sheet, 26 gage, 0.0179 inch (0.45 mm) minimum thickness, G90/Z275 hot-dipped galvanized; PVC coated, color as selected by owner.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.
- B. Verify that deck is of sufficient thickness to accept fasteners.
- C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- D. Verify roof openings are correctly framed.
- E. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.02 INSTALLATION - EAVE PROTECTION MEMBRANE

- A. Install eave protection membrane from eave edge to minimum 4 ft (1 200 mm) up-slope beyond interior face of exterior wall.

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3.03 INSTALLATION - UNDERLAYMENT

- A. At Roof Slopes Up to 4:12 : (At Roof Slopes Up to 1:3 :) Install two layers of underlayment over area not protected by eave protection, with ends and edges weather lapped minimum 4 inches (100 mm). Stagger end laps of each consecutive layer. Nail in place.
- B. At Roof Slopes Greater Than 4:12 (1:3) : Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches (100 mm). Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches (100 mm) over eave protection.
- C. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

3.04 INSTALLATION - VALLEY PROTECTION

- A. Install valley protection in accordance with SMACNA (ASMM), Detail as recommended by manufacturer..

3.05 INSTALLATION - METAL FLASHING AND ACCESSORIES

- A. Install flashings in accordance with NRCA requirements.
- B. Weather lap joints minimum 2 inches (50 mm) and seal weather tight with plastic cement.
- C. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

3.06 INSTALLATION - SHINGLES

- A. Install shingles in accordance with manufacturer's instructions. Follow nailing instructions for the building's wind zone.
 - 1. Fasten individual shingles using 2 nails per shingle, or as required by code, whichever is greater.
 - 2. Fasten strip shingles using 4 nails per strip, or as required by code, whichever is greater.
- B. Place shingles in straight coursing pattern with 5 inch (125 mm) weather exposure to produce double thickness over full roof area. Provide double course of shingles at eaves.
- C. Project first course of shingles 3/4 inch (19 mm) beyond fascia boards.
- D. Extend shingles 1/2 inch (13 mm) beyond face of gable edge fascia boards.
- E. Complete installation to provide weather tight service.

3.07 PROTECTION

- A. Do not permit traffic over finished roof surface.

END OF SECTION

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SECTION 07 4646

FIBER-CEMENT SIDING

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiber-cement siding.

1.02 RELATED REQUIREMENTS

- A. Section 09 9113 - Exterior Painting: Field painting.

1.03 REFERENCE STANDARDS

- A. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets; 2008 (Reapproved 2012).

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's data sheets on each product to be used, including:
 1. Manufacturer's requirements for related materials to be installed by others.
 2. Preparation instructions and recommendations.
 3. Storage and handling requirements and recommendations.
 4. Installation methods, including nail patterns.

1.05 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING

- A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying to ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
 1. Style: Standard lap style.
 2. Texture: Smooth.
 3. Length: 12 ft (3.7 m), nominal.
 4. Width (Height): 5-1/4 inches (133 mm).
 5. Thickness: 5/16 inch (8 mm), nominal.
 6. Finish: Factory applied topcoat.
 7. Warranty: 50 year limited; transferable.
 8. Manufacturers:
 - a. James Hardie Building Products, Inc: www.jameshardie.com/#sle.

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- B. Soffit Panels: Panels made of cement and cellulose fiber, formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
1. Texture: Smooth.
 2. Length: 96 inches (2400 mm), nominal.
 3. Width: 48 inches (1220 mm).
 4. Thickness: 5/16 inch (8 mm), nominal.
 5. Finish: Unfinished.
 6. Color: As selected by Architect from manufacturers full range of available colors.
 7. Manufacturer: Same as siding.

2.02 ACCESSORIES

- A. Trim: Same material and texture as siding. Color as selected.
- B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate minimum 1-1/4 inch (32 mm).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B. Verify that water-resistive barrier has been installed over substrate completely and correctly.
- C. Do not begin until unacceptable conditions have been corrected.
- D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and recommendations.
1. Read warranty and comply with terms necessary to maintain warranty coverage.
 2. Use trim details indicated on drawings.
 3. Touch up field cut edges before installing.
 4. Pre-drill nail holes if necessary to prevent breakage.
- B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.
- C. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.
- D. Do not install siding less than 6 inches (150 mm) from surface of ground nor closer than 1 inch (25 mm) to roofs, patios, porches, and other surfaces where water may collect.
- E. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

- F. Finish Painting: Refer to Section 09 9113.

3.03 PROTECTION

- A. Touch-up, repair or replace damaged products before Date of Substantial Completion.

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SECTION 07 5310

EPDM MEMBRANE ROOFING

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PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes adhered membrane roofing system.

1.02 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples: For each product included in membrane roofing system.
- D. Research/evaluation reports.
- E. Maintenance data.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by Firestone Building Products to install Firestone's product and that is eligible to receive manufacturer's warranty.
- B. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane.
- C. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
- D. Pre-installation Conference: Conduct conference at Project site.

1.04 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

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1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which Firestone agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
1. Warranty Period: 20 years of Firestone Building Product's coverage from date of Substantial Completion.
 2. Extended Wind Speed Warranty: 90 mph

PART 2 PRODUCTS

2.01 EPDM ROOFING MEMBRANE

- A. EPDM Roofing Membrane: ASTM D 4637, Type I, non-reinforced uniform, flexible sheet made from EPDM, and as follows:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
 - a. Firestone Building Products Company basis of design.
 3. Thickness: 60 mil, nominal
 4. Exposed Face Color: Black.

2.02 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Firestone LVOC bonding adhesive.
- D. Seaming Material: Firestone Building Product's standard synthetic-rubber polymer primer and 3-inch- (75-mm-) wide minimum QuickSeam, butyl splice tape with release film. Stripping ply of 5" QuickSeam semi-cured EPDM flashing laminated to cured seam tape.
- E. Fasteners: Factory-coated Heavy Duty fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- F. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

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2.03 ROOF INSULATION

- A. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated to comply with local building codes.
1. Product: Firestone Iso 95+
 2. Thickness: 4.5"
 3. LTTR Value: 25 (Delaware code)

2.04 INSULATION ACCESSORIES

- A. Fasteners: Factory-coated Heavy Duty fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.05 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads, approximately 3/16 inch (5 mm) thick, and acceptable to membrane roofing system manufacturer.

PART 3 EXECUTION

3.01 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with Firestone Building Product's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches (50 mm) or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- E. Fasten insulation at specific rate to achieve 90 mph extended wind speed warranty. Fasten 32 fasteners per board in corner, fasten 24 fasteners per board in perimeter and fasten 16 fasteners per board in field of roof.

3.02 MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

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- C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry. Do not apply bonding adhesive to splice area of roofing membrane.
- D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- E. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations. Install additional 5" QuickSeam FormFlash as outlined in the manufacturer's 20 year detail requirements.
- F. Repair tears, voids, and lapped seams in roofing that does not meet requirements.
- G. Install and apply all details in accordance with the manufacturer's 20 year warranty requirements.

3.03 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.04 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

END OF SECTION

SECTION 07 6100

SHEET METAL ROOFING

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet metal roofing, associated flashings, and underlayment.
- B. Counterflashings.
- C. Snow guards.

1.02 ADMINISTRATIVE REQUIREMENTS

1.03 SUBMITTALS

- A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- B. Color Samples: Submit two samples 12" x 12" inch (304.8 x 304.8 mm) in size illustrating metal finish color.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise noted.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

1.06 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion. Defective work includes repair of leaks and damage occurring due to improper installation methods..
- B. Provide 50 Year year manufacturer warranty for roofing material. Warranty shall include degradation of metal finish.

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PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 zinc coating; 24 gage, 0.0239 inch (0.61 mm) minimum base metal thickness, shop pre-coated with PVDF (polyvinylidene fluoride) coating; color as selected from full color range.

2.02 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type II ("No.30").
- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc molybdate type.
- E. Protective Backing Paint: Zinc molybdate alkyd.
- F. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
- G. Sealant to be Exposed in Completed Work: 1 elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- H. Ice Dam membrane; ASTM D1970; self adhering polymer modified bituminous sheet material, slip resistant surface, 40 mils thick, 36 inches wide, with strippable release paper to expose adhesive surface. Suitable for use under sheet metal roofing.
- I. Snow Guards; Half round pad style layout and quantity as recommended by the manufacturer. Install on ALL metal roofs whether or not shown on drawings.

2.03 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, thickness to match roofing sheet, interlockable with sheet
- C. Fabricate starter strips, interlockable with sheet.
- D. Form pieces in longest practical lengths.
- E. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- F. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

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- H. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing below. Return and brake edges.
- I. Fabricate snow guards to profile as indicated or as selected by Architect if not indicated on drawings..

2.04 FACTORY FINISHING

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
- B. Color: As selected by Architect from manufacturer's full color range.
- C. Primer Coat: On coated sheets, finish concealed side of sheet with primer compatible with finish system as recommended by finish system manufacturer.
- D. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system mfr.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to valleys and eaves.
- B. Verify deck is dry and free of snow or ice. Verify joints in wood deck are solidly supported and fastened.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION - EAVE (ICE DAM) PROTECTION

- A. Apply eave protection sheet in accordance with manufacturer's instructions.
- B. Extend eave protection sheet minimum 4 feet (1 200 mm) upslope as measured in plan, beyond interior face of exterior wall or as local code requires.

3.04 INSTALLATION - ROOFING

- A. Apply underlayment over entire roof area.
 - 1. Apply in single layer laid perpendicular to slope; weather lap edges 2 inches (50 mm) and nail in place.
 - 2. Minimize nail quantity.

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- B. Cleat and seam all joints.

3.05 INSTALLATION - BUILT-IN GUTTERS AND DOWNSPOUTS

- A. Secure gutter lining to substrate with cleats spaced minimum inches (mm) on center along edges of gutters.
- B. Longitudinal joints not acceptable.
- C. At roof edges, extend gutter lining under metal roofing 6 inches (152 mm) minimum and terminate in 3/4 inch (19 mm) folded edge secured by cleats; hook lower end of roofing into lock strip to form 3/4 inch (19 mm) wide loose-lock seam.
- D. Seal gutters watertight, and seal joint of gutter to drain.

3.06 INSTALLATION - FLASHINGS

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Cleat and seam all joints.
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Provide kick flashing at roof to wall intersections

3.07 PROTECTION

- A. Do not permit traffic over unprotected roof surface.

END OF SECTION

SECTION 07 6200

SHEET METAL FLASHING AND TRIM

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings and counterflashings.
- B. Gable and eave edge flashings
- C. Other fabricated sheet metal items.
- D. Refer to DSHA Standards in Division 1

1.02 REFERENCE STANDARDS

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA 1793 and NRCA Roofing and Waterproofing Manual. requirements and standard details, except as otherwise indicated.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Aluminum: ASTM B209 (ASTM B209M); 0.032 inch (0.8 mm) thick; anodized finish of color as selected.
- B. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 0.032 inch (0.8 mm) thick; plain finish shop pre-coated with modified silicone coating.
 - 1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.

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2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing below. Return and brake edges.
- H. Seal metal joints

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 INSTALLATION

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Seal metal joints watertight.

END OF SECTION

SECTION 07 7123

MANUFACTURED GUTTERS AND DOWNSPOUTS

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pre-finished aluminum gutters and downspouts.
- B. Refer to DSHA Standards in Div 1

1.02 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- B. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.03 DESIGN REQUIREMENTS

- A. Conform to SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- B. Conform to applicable code for size and method of rain water discharge.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pre-Finished Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.040 inch (.12 mm) thick base metal or as thick as required to maintain shape.
 - 1. Finish: Shop pre-coated with modified silicone coating.
 - 2. Color: As selected from manufacturer's standard colors.

2.02 COMPONENTS

- A. Gutters: CDA rectangular style profile.
- B. Gutters: Half Round at Porch roofs with adjustable brackets to accommodate decorative rafters.
- C. Downspouts: CDA Rectangular profile.
- D. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: In accordance with SMACNA requirements.

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2. Gutter Supports: Brackets.
3. Downspout Supports: Brackets.

2.03 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

3.02 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/4 inch per foot (.82 mm/m), .0208 percent minimum.
- D. Connect downspouts to downspout boots at 48 inches (609 mm) above grade. Seal connection watertight.
- E. Connect downspouts to storm sewer system. Seal connection watertight.

END OF SECTION

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SECTION 07 7200

ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof hatches.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Submit detailed layout developed for this project. Show dimensioned location and number for each type of roof accessory.
- C. Warranty Documentation:
1. Submit manufacturer warranty.
 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.04 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 **ROOF HATCHES1 HOUR FIRE RATED**

- A. Manufacturers - Fire Rated Roof Hatches:
1. Bilco Company; Type S (ladder access, standard size, solid cover): www.bilco.com/#sle.
 2. Dur-Red Products: www.dur-red.com.
 3. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
 4. Substitutions: In accordance with Contract Documents
- B. Roof Hatches: Factory-assembled steel frame and cover, complete with operating and release hardware.
1. Style: Provide flat metal covers unless otherwise indicated.
 2. Mounting: Provide frames and curbs suitable for mounting on flat roof deck.

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- C. Frames/Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
1. Material: Galvanized steel, 14 gage, 0.0747 inch (1.90 mm) thick.
 2. Finish: Factory prime paint.
 3. Insulation: 1 inch (25 mm) rigid glass fiber, located on outside face of curb.
 4. Curb Height: 12 inches (305 mm) from finished surface of roof, minimum.
- D. Metal Covers: Flush, insulated, hollow metal construction.
1. Capable of supporting 40 psf (1.92 kPa) live load.
 2. Material: Galvanized steel; outer cover 14 gage, 0.0747 inch (1.90 mm) thick, liner 22 gage, 0.03 inch (0.76 mm) thick.
 3. Finish: Factory prime paint.
 4. Insulation: 1 inch (25 mm) rigid glass fiber.
 5. Gasket: Neoprene, continuous around cover perimeter.
- E. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf (475 kPa) load.
 2. Hinges: Heavy duty pintle type.
 3. Hold open arm with vinyl-coated handle for manual release.
 4. Latch: Upon closing, engage latch automatically and reset manual release.
 5. Manual Release: Pull handle on interior.
 6. Locking: Padlock hasp on interior.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.
- B. Paint final finish coats as required.

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3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion

END OF SECTION

SECTION 07 8400

FIRESTOPPING

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PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Firestopping for through penetrations and joints in fire rated assemblies.
 - 2. Firestopping at top of fire rated walls.
 - 3. Firestopping of devices penetrating one face of fire rated partition that are not separated by minimum code required distance.
 - 4. Smoke sealing joints between floor slabs and exterior walls.
- B. Refer to DSHA Standards in Division 1.

1.02 SYSTEM DESCRIPTION

- A. Firestopping Materials: ASTM E119 or ASTM E814 to achieve fire ratings as indicated on Drawings, but not less than 1-hour fire rating.
- B. Surface Burning: ASTM E84 with a maximum flame spread / smoke developed rating of 25/450.
- C. Firestopping interruptions to fire rated assemblies, materials, and components.

1.03 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for fire resistance ratings and surface burning characteristics.

1.04 SUBMITTALS

- A. Product Data:
 - 1. Submit data on product characteristics, performance and limitation criteria.
 - 2. Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings and to maintain fire resistance rating of adjacent assembly.
 - 4. Submit descriptions of tested designs listed in submitted schedule.
- B. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- C. Manufacturer's Certificate: Certify products meet or exceed specified and applicable code requirements. Certify applicator is approved by manufacturer.
- D. Engineering Judgments: For conditions not covered by UL or WH listed designs, provide judgments by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting fire protection requirements.

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1.05 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with a minimum of three years documented experience, approved by manufacturer.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F
- B. Maintain this minimum temperature before, during, and for minimum 3 days after installation of materials.
- C. Provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.01 FIRESTOPPING

- A. Manufacturers:
 - 1. 3M Fire Protection Products.
 - 2. Specified Technologies, Inc.
 - 3. Hilti Corporation.
 - 4. Nelson FireStop Products.
 - 5. RectorSeal; Metacaulk Firestopping Products.
 - 6. RectorSeal; Bio Fireshield Firestopping Products.
 - 7. Substitutions: In accordance with Contract Documents.
- B. Product Description: Listed as components of tested design, appropriate for the physical configuration of each penetration and as required by the fire resistance rating indicated and the provisions of Article: SYSTEM DESCRIPTION.
 - 1. Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
- C. Color: As selected from manufacturer's full range of colors.

2.02 FILL, VOID, AND CAVITY MATERIALS

- A. Fill, Void, and Cavity Materials: One or more of the following types, as appropriate for particular construction conditions:
 - 1. Silicone foam material, room temperature vulcanizing, 14 to 20 lb/cu ft density.
 - 2. Silicone sealant material, except on finished surfaces to be painted.
 - 3. Caulk type material.
 - 4. Putty type material.
 - 5. Composite sheet type material, 1/4 inch nominal thickness, foil-faced.

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6. Wrap strip type material, 1/4 inch nominal thickness, ~~intumescent elastomeric~~
- B. Packing Materials: One or more of the following types, as appropriate for particular construction conditions:
 1. Ceramic fiber blanket, 4 lb/cu ft density.
 2. Ceramic fiber insulation, minimum 1 inch thick, 8 lb/cu ft minimum density
 3. Mineral wool batt insulation, 6.0 lb/cu ft minimum density
- C. Forming Materials: As required by tested design for particular construction conditions.

2.03 ACCESSORIES

- A. Metal Sleeves: Selected from the following as most appropriate for the application:
 1. Steel pipe, Schedule 5S minimum up to 6 inch diameter, Schedule 10S minimum above 6 inch diameter.
 2. Rigid steel conduit, galvanized.
 3. Steel EMT conduit.
- B. Metal Lath: 3.4 lb/sq yd expanded steel.
- C. Support Angles: 3 x 3 x 1/4 inch, welded, to form integral framework on both sides of the wall secured through wall with threaded steel rods, nuts, and washers.
- D. Support Hangers: Steel wire, No. 9 SWG, unless otherwise required by the listed system.
- E. Restraining Mesh: No. 9 SWG, galvanized steel wire, twisted to 1 inch hexagons, with additional straight No. 9 SWG galvanized steel wires woven into the mesh 12 inches on center for stiffness.
- F. Hardware cloth, maximum 1/2 x 1/2 inch welded mesh of minimum 0.041 inch (No. 19 SWG) galvanized steel wire.
- G. Banding strap, nominal 5/8 inch x 0.020 inch thick steel straps used in conjunction with nominal 1 inch long channel-shaped crimp clips formed of 0.020 inch thick galvanized steel.
- H. Seam cover, nominal 4 inch wide by minimum 0.019 inch thick galvanized steel.
- I. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- J. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive firestopping.
- B. Verify that penetrating elements are securely fixed and properly located; with a minimum of 1/2 inch space between penetrations and surfaces of openings unless otherwise required or permitted by tested design.

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3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.
- C. Install backing materials to arrest liquid material leakage.

3.03 APPLICATION

- A. Install material at fire rated construction perimeters and openings which contain penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- D. Compress fibered material to maximum 40 percent of its uncompressed size, unless otherwise indicated on drawings.
- E. Remove dam or forming material not required to remain as part of the system, after firestopping material has cured sufficiently to remain in place.
- F. Provide firestopping to all cavities within walls to from finished floor down 18" and 18" below roof level.
- G. Provide all firestopping as required by the jurisdiction inspecting the work as part of the contract.

3.04 FIELD QUALITY CONTROL

- A. Inspect installed firestopping for compliance with specifications and submitted schedule.
- B. Inspect firestopping systems, minimum 48 hours after installation, for adhesion and set of sealant materials. Correct deficiencies and reinspect to verify compliance with requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.
- B. Remove excess firestopping materials for neat appearance in areas left exposed to view in finished construction.

3.06 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect adjacent surfaces from damage by material installation.

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SECTION 07 9000

METAL FLASHINGS AND SEALANTS

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PART 1.0 - GENERAL

1.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:

- A. Work includes but is not necessarily limited to the following:
 - 1. Metal Flashings where noted.
 - 2. Exterior sealants where noted.
- B. Related Sections include the following:
 - 1. Section 06200/06250 - Carpentry & Wood Restoration
 - 2. Section 08200 - Window & Door Restoration
 - 3. Section 09900 - Painting & Coatings

1.02 REFERENCES

FLASHINGS

- A. Standards of the following associations and current publications shall apply to materials furnished under this section:
 - 1. American Society for Testing and materials (ASTM) Philadelphia, PA (215) 299-5585.
 - 2. Copper and Common Sense, Eighth Edition, Revere Copper Products, Inc., One Revere Park, Rome, NY; 800-448-1776.
 - 3. Sheet Metal and Air Conditioning National Association (SMACNA), Architectural Sheet Metal Manual, Current Edition

SEALANTS

- B. American Society for Testing and Materials (ASTM):
 - 1. C 920; Specification for Elastomeric Joint Sealants.
 - 2. C 1193-95; Standard Guide for Use of Joint Sealants
 - 3. D 1056; Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.

1.03 SUBMITTALS

- A. Product Literature: Submit manufacturer's product literature including technical data, application instructions and standard color samples for each type of joint sealant and accessory product required.
- B. Submit manufacturer's standard bead samples consisting of strips of actual product showing full range of colors available for each sealant product exposed to view. Color(s) to be selected by the Architect and Owner.
- C. Submit 12-inch long sample of proposed backer rod. Submit certification from sealant manufacturer that backer rod is compatible with sealant.

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- D. Samples consisting of 12" square specimens of specified metal flashing material
- E. Shop drawings showing manner of forming, joining, and securing copper roofing, and pattern of seams. Show expansion joint details and waterproof connections to adjoining work and at obstructions and penetrations.

1.04 QUALITY ASSURANCE

- A. Use skilled workers who are trained especially in properly laying and forming sheet metal and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this section. Installer shall provide a warranty, in writing, against defects in material and installation for a period of five years.
- B. Test Panels:
 - 1. Architect shall select locations for the Contractor to install 2 linear feet of each type of sealant required. Locations shall include at least one type of condition on each building, including masonry joints and siding / wood trim joints.
 - 2. After curing and prior to approval of the test panel, the installer shall test adhesion of the sealant joint by manually trying to pull the sealant from the joint. Test shall be performed in the presence of the Architect.
 - 3. Architect shall select locations for the Contractor to install 2 linear feet of each type of flashing required. Locations shall include at least one type of condition on each building, including masonry joints and siding / wood trim joints, and roofing intersection (Buildings 18 & 20).

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver all products in original packaging with manufacturer's name and product identification visible thereon. Store in a protected area within the temperature range recommended by the sealant manufacturer.
- B. Store zinc-coated copper sheet and coil products so as to maintain dry conditions and to exclude condensation from occurring on any zinc-coated copper surfaces.
- C. Coordinate zinc-coated copper roofing with rain drainage work, flashing, trim and construction of sheathing to provide a permanently leak-proof, secure, and noncorrosive installation.

1.06 PROJECT CONDITIONS

- A. Sealant installation shall occur only when the surface and ambient temperature are within the range specified by the manufacturer and in accordance with favorable conditions as defined in ASTM C 1193-95. Do not install sealants when moisture or frost is present on the surface.
- B. The Contractor shall protect adjacent materials during the execution of the work. Excess sealant on adjacent materials shall be removed before curing to avoid stains and discoloration.

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PART 2.0 - PRODUCTS:

2.01 SHEET METAL:

- A. Provide sheet metal for roofing and flashings by the following company or approved alternate:
1. Revere Copper Products, Inc., One Revere Park, Rome, NY; 800-448-1776, product "Freedom Gray", TCS II Zinc-Tin Alloy. Copper shall be standard ounce-weight material, conforming with ASTM Specification B370, coated on both sides with 50% / 50% zinc-tin alloy a minimum of 0.0005" thick per side. The Z-T alloy shall be applied by the hot-dipped process and shall have a satin finish. Provide and install the following weights:
 - a. 12 ounce for standard flashing, 16 ounces for caps and coping.
 2. Alternate Material: Contrarian Metal Resources, 51 QSI Lane, Allison Park, PA 15101. Contact Lee McGeady at 1-908-328-9407. Metal shall be 316 Stainless Steel, with micro-burnished finish known as "T 316 INVARI-MAT". Provide and install the following thicknesses:
 - a. .018 thickness (26 Gauge) for flashing and coping and ridge cap.

2.02 SEALANTS:

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work shall include the following:
1. ChemRex, Inc., Shakopee, MN
 2. Pecora Corporation, Harleysville, PA
 3. Tremco, Inc., Beachwood, OH
 4. Dow Corning Corporation, Midland, MI
 5. Sika Corporation, Lyndhurst, NJ
- B. Exterior sealant shall be gun-grade, non-staining, single component polyurethane sealant, "Dynatrol I" by Pecora Corp., or approved equal.
- C. Backer rod shall be a polyethylene rod of diameter recommended by manufacturer for opening width. Verify compatibility of backer rod and sealant before installation

PART 3.0 - EXECUTION:

3.01 INSTALLATION - SEALANT

- A. Remove loose materials and foreign matter which might impair adhesion of sealant. Install joint backing to achieve a depth dimension no greater than 1/3 the joint width.
- B. Clean (and prime) joints and install sealant in accordance with manufacturer's instructions.
- C. Install sealant within recommended application temperature ranges. Install sealant free of air pockets, foreign imbedded matter, ridges and sags. Tool joints concave.

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3.02 INSTALLATION - SHEET METAL FLASHING

A. PREPARATION

1. Clean surfaces to receive sheet metal roofing. Substrate to be lightly sanded smooth and free of defects. Drive all projecting screw heads, nails, or other fasteners flush with surface. Remove all splinters resulting from fastener installation.

B. METAL FLASHINGS:

1. Install flashings in accordance with SMACNA requirements, and details of the drawings.
2. Weather-lap un-seamed joints a minimum of 4 inches, use lock-seam joints at others. Continuously solder lock seams, in the same day as seam is formed, to prevent intrusion of moisture and dust. After soldering, wash metal clean with neutralizer solution and rinse with water.
3. Minimize soldering in-situ by first forming seams in place and then removing the fabricated item to a scaffolding or to grade for soldering. Install fabricated item in place after soldering.
4. Install cap flashings in saw cut reglets with lead wedges and mortar. (At Masonry)
5. Flash and seal all roof penetrations.

END OF SECTION

SECTION 07 9005

JOINT SEALERS

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.
- B. Precompressed foam sealers.
- C. Hollow gaskets.
- D. Spray polyurethane foam gap and crack sealer.
- E. Refer to DSHA Standards in Division 1.

1.02 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- D. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.

1.03 SUBMITTALS

- A. Product Data: Provide data indicating sealant chemical characteristics.
 - 1. Submit data for sealant materials, performance, and substrate preparation.
 - 2. Indicate available colors for each sealant type for selection, color per finish schedule.
- B. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.04 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.05 WARRANTY

- A. Correct defective work within a five year period after Date of Substantial Completion.
- B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gunnable and Pourable Sealants:
1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 2. Dow Corning Corporation: www.dowcorning.com.
 3. GE Construction Sealants.
 4. Hilti, Inc: www.us.hilti.com.
 5. Pecora Corporation: www.pecora.com.
 6. Tremco Global Sealants: www.tremcosealants.com.
 7. Sherwin-Williams Company: www.sherwin-williams.com.
 8. Sika Corporation: www.usa-sika.com.
 9. W.R. Meadows, Inc: www.wrmeadows.com.

2.02 SEALANTS

- A. Type A - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Type M, Grade NS, Class 25 minimum; Uses M, O, and A; two component, chemical curing, non staining, non bleeding, capable of continuous water immersion.
1. Color: Match adjacent finished surfaces.
 2. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior non-traffic bearing joints for which no other sealant is indicated.
 3. Polyurethane Products:
 - a. Pecora Corporation; DynaTrol II General Purpose Two Part Polyurethane Sealant: www.pecora.com.
 - b. BASF Construction Chemicals-Building Systems; Sonneborn; NP2: www.buildingsystems.basf.com.
 - c. Sherwin-Williams Company; Stampede 2NS: www.sherwin-williams.com.
 - d. Tremco; Dymeric 240.
- B. Type B - Polyurethane Traffic Joints; ASTM C920, Type M, Grade P, Class 25; Self leveling; two component, chemical curing, non staining, non bleeding, capable of continuous water immersion.
1. Size as required to provide weathertight seal when installed.
 2. Provide product recommended by manufacturer for traffic-bearing use.
 3. Applications: Use for Interior Horizontal Traffic Joints:
 - a. Exterior wall expansion joints.
 - b. Joints in concrete floors
 - c. Other Traffic load bearing joints for which no other sealer is indicated..
 4. Products:
 - a. Tremco Global Sealants; THC-900: www.tremcosealants.com.
 - b. BASF Building Systems; Sonneborn; Sonolastic SL2.
 - c. Pecora; Urexpan NR-200

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- d. Sherwin-Williams; Stampwede 2SL
- C. Type C - Polyurethane Interior Joints; ASTM C920, Type S, Grade NS, Class 25; Use NT; M,A,O, Single component, chemical curing, non staining, non bleeding, capable of continuous water immersion.
 1. Products
 - a. Tremco Global Sealants; [THC-900]: www.tremcosealants.com
 - b. BASF Building Systems; Sonneborn; Sonolastic S
 - c. Pecora; Urexpan NR-200
 - d. Sherwin-Williams; Stampwede 2SL
 2. Applications: Use for Interior non-traffic Joints:
 - a. Interior wall and ceiling control joints.
 - b. Joints between interior surfaces and exterior wall components.
 - c. Other interior dynamic joints.
- D. Type D - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable non staining, nonbleeding, nonsagging.
 1. Applications: Use for interior Joints wher sanitary sealant is not required:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other Joints where no other type of sealant is indicated..
 - d. Other interior joints for which no other type of sealant is indicated.
 2. Products:
 - a. Pecora Corporation; AC-20 + Silicone Acrylic Latex Caulking Compound: www.pecora.com.
 - b. BASF Construction Chemicals-Building Systems; Sonneborn; Sonolac: www.buildingsystems.basf.com.
 - c. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: www.sherwin-williams.com.
 - d. Tremco Global Sealants; Tremflex 834: www.tremcosealants.com.
 - e. OSI Sealants, Inc; Pro Series, SA167.
- E. Type E - Bathtub/Tile Sanitary Sealant: Silicone; ASTM C920, Uses I, M and A; single component, mildew/ fungus resistant solvent curing, non-sagging , non staining, nonbleeding.
 1. Applications: Use for:
 - a. Joints between plumbing fixtures and floor and wall surfaces.
 - b. Joints between kitchen and bath countertops and wall surfaces.
 - c. Joints between toilet accessories and adjacent surfaces.
 2. Products:
 - a. Pecora Corporation; 898NST Sanitary Silicone Sealant - Class 50: www.pecora.com.
 - b. Tremco Global Sealants; Tremsil 200: www.tremcosealants.com.
 - c. GE Construction Sealants; Sanitary SCS1700 Series
 - d. Dow Corning; 786 Silicone Mildew Resistant Sealant.
- F. Type F - Butyl or Polyisobutylene,Sealant: ASTM C1311; single component, non drying non curing, non-skinning, non-sagging.
 1. Movement Capability: Plus and minus 12-1/2 percent.
 2. Service Temperature Range: -13 to 180 degrees F (-25 to 82 degrees C).

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3. Applications: Use for:
 - a. Concealed sealant bead in sheet metal and flashing work.
 - b. Other concealed joints specified in other sections.
- G. Type I - Sprayed Polyurethane Foam Gap and Crack Sealer: AAMA 812, Uses T, I, M, A, O;
One or Two component, foamed in place, chemical curing, non-staining, non-bleeding, capable
of continuous water immersion, self-leveling type.
 1. Density 1.5 PCF maximum
 2. Surface Burning characteristics: ASTM E84
 - a. Flame Spread Index: 25, maximum
 - b. Smoke Developed Index: 450, maximum
 - c. Initial R value: ASTM C518; 4 per inch thickness, minimum.
 - d. Maximum Pressure 1.25 psig

2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.

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- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave, unless indicated otherwise on Drawings..
- H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch (3 to 6 mm) below adjoining surface.
- I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch (3 to 6 mm) below adjoining surface.

3.04 Installation- Spray Polyurethane Foam

- A. Install spray polyurethane foam gap and crack sealer in accordance with the manufacturer's instructions,
- B. Fill cracks and gaps at wall framing openings to provide continuous thermal barrier.
- C. Install foam without causing deflection in adjacent window and door frames in excess of allowable tolerances for proper operation and performance of windows and doors.
- D. Trim excess foam flush with adjacent surfaces.

3.05 CLEANING

- A. Clean adjacent soiled surfaces.

3.06 PROTECTION

- A. Protect sealants until cured.

END OF SECTION

SECTION 08 2000

WINDOW & DOOR RESTORATION

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PART 1 - GENERAL

- 1.01 DESCRIPTION: Windows at Buildings #16, #18, #20, #22, #24, #26:
- A. Perform Window Restoration at windows in the facades of individual buildings, according to the following descriptions and Scope of Work Notes on the drawings:
 - B. NOTE 8.1 LEVEL ONE: Full Window Restoration (Historic Wood Windows); Antique wood windows with true divided lites, and sash weights and chains / or cords.
 - C. Remove storm window panes and screen sashes, and mark for re-installation in exact locations. Restore sashes with selective glazing putty replacement, where missing at windows sashes. Remove loose and flaking paint, properly prepare and re-paint. Retaining existing glass panes, unless noted. Check sash-lifting mechanisms, and hardware for operability, and record whether working or not, in the Window Schedule.
 - D. NOTE 8.2 LEVEL 2: Moderate Window Restoration (Replacement Wood Windows - 20th-century); Modern era wood windows with wood muntins, and spring-loaded or steel tape sash balances.
 - E. Clean tracks of storm window panes and screens, lubricate and slide up and down to confirm operability and fit. Record the quality of function in the Window Schedule. Record conditions of glass panes and screen frames, and record in the Window Schedule. Repair glass and screens in place.
 - F. NOTE 8.3 LEVEL 3: Light Window Restoration (Replacement Vinyl Windows - 20th-century); Late 20th-century and 21st- century vinyl or metal-clad replacement windows (typically with string balances).
 - G. Clean tracks of storm window panes and screens, lubricate and slide up and down to confirm operability and fit. Wash exterior surfaces of sashes and glazing. Paint Exterior of storm / screen frame.
 - H. NOTE 8.4 LEVEL 4: Wood Window Replacement (Historic Wood Windows at attics and upper floors).
 - I. Replace existing severely damaged wood window to match existing, single hung, with no sash balancing mechanism. Glaze with modern glass and exterior glazing putty. Fix sashes in place with removable screw-fasteners.
 - J. NOTE 8.5 LEVEL 5: Basement Windows.
 - K. Remove existing deteriorated wood and synthetic material windows including frames. See other specifications sections for lintel and jamb repairs. Install new preservative treated wood window frame and new vinyl basement window (awning or sliding type per architect's selection.

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1.02 DESCRIPTION: Windows and doors at Storage Shed:

- A. Repair and restore all existing wood windows including frames, sills, sashes, glazing and operating mechanisms.
- B. Restore one wood entry door including frames, leaf and threshold.
- C. Provide and install new wood roll-up door where indicated, including frame, panels, track, lifting hardware, and threshold.

1.03 DESCRIPTION: Restoration of Exterior Doors:

- A. Restore surface scuffs and blemishes, and minor wood rot, of selected wood doors where noted including frames, panels, stiles & rails, glazing, thresholds and sidelights.

1.04 RELATED SECTIONS

- A. Section 06200 - Carpentry
- B. Section 06250 - Wood Restoration
- C. Section 07900 - Sealants.
- D. Section 09900 - Painting and Finishing.

1.05 REFERENCES

- A. The "Quality Standards," latest edition of the Architectural Woodwork Institute shall apply to the work of this section.
- B. Wood window restoration shall conform to the Guidelines of the Secretary of the Interior for Historic Preservation. Techniques employed for window and door repair and restoration shall be as outlined in Preservation Brief No. 9, "The Repair of Historic Wooden Windows," (1981) as published by the National Park Service.
 - 1. <https://www.nps.gov/tps/how-to-preserve/briefs/9-wooden-windows.htm>

1.06 SUBMITTALS

- A. Window Schedule:
 - 1. Contractor shall produce and submit a detailed schedule for all wood windows to be restored, at the levels described above, Organized by building number and separate for the storage shed. Include opening sizes as verified in field, number and sizes of lights, type of hardware, operability, type and condition of sash-weight balancing mechanism, etc. Schedule shall also classify existing window hardware for each opening in accordance with the types and styles set forth in the drawings.
- B. Product Literature:
 - 1. Submit manufacturer's product literature for all proprietary products specified for window restoration and cleaning work such as consolidant, fillers, glazing putty, etc.

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Product literature shall include specification data, Material Safety Data Sheets and instructions for storage, handling, and use.

2. Submit supplier's certification for graded but unmarked lumber, preservative treated wood, composite and synthetic wood, attesting that materials meet their industry grade requirements.
3. Submit manufacturer's product literature for all new window hardware components and weather-stripping. Literature shall include material specifications and gauges, dimensions, fabrication information, installation instructions, etc.
4. Submit manufacturer's product literature for all new windows, such as basements.

C. Samples:

1. Submit one sample of each type of new hardware item to be used.
2. Submit two 6-inch samples of each type of weather-stripping required.
3. Sample two samples of each wood species, preservative treated wood, composite and synthetic wood, for replacement/repairs.
4. Submit one sample of each type of glass to be used for replacement.

1.07 QUALITY ASSURANCE

- A. The Contractor performing the work of this section shall have a minimum of ten years experience in repair and restoration of wood windows. He/she shall have successfully completed at least three window restoration projects of similar scope within the previous five years.

1.08 MOCK-UPS

- A. The Contractor, at locations determined by the Architect and Owner, shall prepare mock-ups of the following work:
1. Restoration of one typical wood window, LEVEL 1 AND LEVEL 2.
 2. Restoration of one typical vinyl / clad window, LEVEL 3.
- B. Mock-up shall demonstrate the full range of restoration techniques required to complete the project. Techniques include epoxy consolidation; dutchman repairs, glazing, painting and installation of sealants (See Sections 07900 and 09900).
- C. Completed repairs shall be reviewed and approved by the Architect prior to completion of the painting mock-up at this window. Coordinate repairs with sealant installation and finishing by Painting Contractor.
- D. More than one mock-up may be required to be acceptable for approval. The Contractor shall prepare up to three mock-ups of each type, if necessary, without further compensation. Approved test panels shall become part of the work and shall serve as the quality standard for all similar work.

1.09 DELIVERY, STORAGE, HANDLING AND DISPOSAL OF MATERIALS

- A. Deliver restoration and repair materials to the project site in manufacturer's or distributor's packaging, unopened, undamaged, and complete with instructions for application and use.

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- B. Store epoxy fillers, consolidant and other restoration materials away from direct sunlight and within the temperature range specified by the manufacturer. Avoid contamination with water, dust or other substances. Contaminated materials shall not be used.
- C. Store millwork materials off the ground, under cover and protected from weather and construction activities.
- D. Deliver new factory-assembled windows to the site for storage in a protected location prior to installation. Contractor shall make good all broken glass and mechanical damage to windows in the course of storage and installation.
- E. The Contractor shall dispose of all waste materials, packaging and debris in accordance with local, state and federal environmental regulations. No burning of debris shall be allowed on site.

1.10 PROJECT / SITE CONDITIONS

- A. The work of this Section is to be executed only when the air and surface temperatures are at least 40 degrees Fahrenheit and are expected to remain at or above 40 degrees Fahrenheit for at least two weeks after completion of the work.
- B. It is acceptable and may be advisable for existing items to be removed to a controlled environment, for paint removal, cleaning, restoration, and new primer and finish paint application. If so, components shall be cataloged, numbered and later returned and reinstalled in their original locations. Temporary protect shall be installed over door and window openings if and when they are absent.
- C. The Contractor is responsible for protecting existing adjacent materials during the execution of the work. Provide all necessary protection and work procedures to avoid damage to existing material assemblies not a part of the work of this Section. At a minimum, the Contractor shall:
 - 1. Protect adjacent exterior siding and masonry during repairs to existing windows, frames and glazing. Contractor shall make good any damage to adjoining surfaces to the satisfaction of, and at no additional cost to, the Owner.
 - 2. Window openings from which sashes are removed shall be temporarily covered and secured with rigid and waterproof material to protect against the elements and prevent unauthorized access to the building. Holes or fasteners may not be installed in the masonry without prior approval of the Architect and Owner.
 - 3. Protect finished floors and trim in work areas from nicks, scratches and mechanical damage during window removal and reinstallation.
- D. Any window parts removed from the site shall be labeled with all necessary information including their window numbers and their location to ensure reinstallation in the proper location.
- E. Existing metal security grilles shall be removed to facilitate window restoration work when necessary. Where security grilles are removed, the Contractor shall provide temporary bars or other rigid barrier to prevent unauthorized entry.
- F. The Contractor shall be responsible for disposal of waste materials and other debris associated with the work of this Section in accordance with local, state and federal environmental regulations.

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PART 2 - PRODUCTS

2.01 WOOD MATERIALS

- A. Wood species for new components and dutchman patches to repair existing window frames shall be naturally durable species such as Honduras Mahogany, African Mahogany, Cedro (Spanish Cedar), Cypress, or other species approved by the Architect and Owner.
- B. Moisture Content
1. Moisture content shall be within the ranges allowed by applicable woodworking standards; i.e. 12% to 15%, but in no case greater than 19%.

2.02 MAN-MADE MATERIALS

- A. Provide composite and / or synthetic wood materials, where allowable, from one of the following manufacturers:
1. Trade name here, by manufacturer name here, address, city, contact phone number 000-000-0000.
 2. Trade name here, by manufacturer name here, address, city, contact phone number 000-000-0000.
 3. Trade name here, by manufacturer name here, address, city, contact phone number 000-000-0000.

2.03 FASTENERS

- A. Provide nails and screws of the types and sizes required to adequately secure the work. Fasteners shall be of material and finish appropriate for the intended use. Hot-dip galvanized nails or 304 stainless steel screw fasteners shall be used for work to be exposed to the exterior.

2.04 WOOD REPAIR MATERIALS

- A. Epoxy Consolidant: Epoxy consolidant shall be a type with regular and proven use for consolidation of decayed wood. Epoxy shall have low viscosity and be slow setting to allow for successive applications. When fully cured, epoxy shall be more flexible than wood at temperatures of 50 degrees to 100 degrees Fahrenheit range. Provide from one of the following manufacturers:
1. "Flexible Epoxy Consolidant 100"; ConServe Epoxy, LLC, P.O. Box 454, Northford, CT 06472; 203-484-4123.
<http://conservepoxy.com/mm5/merchant.mvc?Screen=PLST>
 2. "Liquid Wood"; Abatron, Inc., 5501 - 95th Avenue, Kenosha WI 53144; 800-445-1754; 262-653-2000. www.abatron.com/product/wood-restoration-kit/
 3. "West System"; Gougeon Brothers, Bay City, MI; 866-937-8797.
<https://www.westsystem.com/products/>
 4. Architect approved equal.
- B. Adhesives and Fillers:

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1. Wood Glue: Water activated polyurethane glue (Gorilla Glue) as manufactured by the Gorilla Glue Company, Cincinnati, OH; 1-800-966-3458.
<https://www.gorillatough.com/products/>
2. Epoxy filler for consolidated woodwork to be painted. Non-shrinking, moisture resistant, paintable epoxy wood filler such as "Flexible Epoxy Patch" from ConSery Epoxy, LLC or "WoodEpoxy" from Abatron; or Architect approved equal.

2.05 WEATHERSTRIPPING

- A. Sill, Head and Jambs: Accurate Series No.: 10B-UP or similar, .018" cold-rolled bronze rib strip. Width of strip and tongue height and width to fit existing rabbets in window sash.
- B. Meeting Rail: Accurate Series No.: 10B-UP or similar, .020" cold-rolled spring bronze. Width of strip to fit width of existing meeting rail above rabbet.
- C. Install bronze weather-strip using bronze nails or screws as recommended by the manufacturer.
- D. Bronze weather-stripping to be products of one of the following manufacturers:
 1. Accurate Metal Weather-stripping Co., Inc.; 725 South Fulton Avenue, Mount Vernon, NY 10550; 800-536-6043.
 2. Pemko Products, 4226 Transport Street, Ventura, CA 93003; 800-283-9988.
<https://www.assaabloydooraccessories.us/en/local/assaabloydooraccessoriesus/contact/contact-pemko/>

2.06 GLASS AND GLAZING

- A. Retain existing glass where intact. Replace only cracked or otherwise damaged or missing glass.
- B. Float Glass: 1/8 inch thick, clear float glass to match existing, or restoration or recycled glass if there are noticeable imperfections in particular windows.
- C. Tempered glass: ASTM C 1048 Glazing Select Quality, Q3, 1/4 inch thick, clear heat-treated float glass
- D. Glazing Putty: Stiff, organic, oil-based glazier's putty, per DAP 33 or equal.

2.07 FINISHES

- A. Refer to Section 09900 - Painting and Finishing.

2.08 NEW WINDOW MANUFACTURERS (Basements only).

- A. Provide products from one of the following manufacturers, custom sized and built from stock manufactured components, to match the dimensions and profiles necessary in the applicable openings, of the existing windows:
 1. Trade name here, by manufacturer name here, address, city, contact phone number 000-000-0000.
 2. Trade name here, by manufacturer name here, address, city, contact phone number 000-000-0000.

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3. Trade name here, by manufacturer name here, address, city, contact phone number
000-000-0000.

2.09 NEW STORM WINDOW MANUFACTURERS (if required)

- A. Provide products from one of the following manufacturers, custom built from stock manufactured components, to match the dimensions of the existing windows.
 1. Quanta Panel Insulating Glass System, 1036 New Holland Ave., Lancaster, PA 17601;
Phone: (717) 295-6610, Fax: (866) 217-2456

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall closely examine woodwork to familiarize himself with the extent of the work required. The Contractor shall meet on site, prior to undertaking work, with the Owner and Architect to coordinate, review and schedule the work.

3.02 WOOD WINDOW RESTORATION

- A. Restore / repair window sashes in place for economy of cost. Existing stops and parting beads shall remain in place where possible. Remove interior and exterior non-original sill cladding (where applicable), window treatments and related appurtenances.
- B. Remove deteriorated glazing putty by scraping or by use of chemical paint remover. Remove and salvage glass to the extent possible except where indicated. See Section 09900 for specified paint removal products and procedures.
- C. Cut out areas of deteriorated wood down to sound material for dutchman or epoxy patching and remove damaged members for replacement as indicated. Leave mating surfaces smooth and flat for installation of wood dutchman materials. Square off areas to receive patches.
- D. Replace severely deteriorated portions with wood dutchmen, shaped to match the existing dimensions and profiles. Grain of dutchman material to align with grain of member to be patched. Dutchman patches to fit snugly on all sides, leaving only hairline gaps. Affix patches with wood glue or finish nails depending on size and location of patch.
- E. Treat heavily checked, weathered and abraded wood surfaces to remain with epoxy consolidant and epoxy wood filler as specified. Fill large holes and gouges flush with adjacent surfaces. Tool epoxy fill material to match existing molding profiles.
- F. Replace all missing, broken and unusable parts with new wood components of the same wood species. Match existing work in profile, size, arrangement and character. Secure new parts to existing material using glue and acceptable concealed fasteners in a rigid and secure manner.
- G. Tighten open joints with wood glue and finishing nails properly countersunk. Fill all joints that cannot be closed without dismantling window, and all holes, gouges, cracks and depressions with wood filler. Sand filled areas level with adjacent surfaces. Repairs to molded areas shall be shaped to the same profile as the original.

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- H. Where sashes are warped and inoperable, plane stiles and rails, and/or adjust the location of sash stops as required to allow smooth operation.
- I. Prime paint window sashes prior to re-glazing. After the windows are primed, re-glaze windows, tooling as required to form a uniform, waterproof seal. Coordinate priming and glazing of the windows with the work of other trades.
- J. Caulk joint between base of exterior jamb trim and sill.
- K. Coordinate woodwork repairs with the work of other trades (i.e. painting).

3.03 REPAIR OF DETERIORATED WOODWORK

A. Epoxy Consolidation:

- 1. Where major components exhibit moderate, localized deterioration, epoxy consolidation may be used in lieu of replacement to maximize the retention of original material. Heavily weathered but still sound exterior surfaces shall also be consolidated prior to filling and painting.
- 2. Remove loose paint, dirt and other foreign material where wood is to be consolidated in deteriorated areas, all loose and soft wood decay must be removed prior to application of epoxy consolidant. Attempt to remove decay down to good wood. If not visible, 3/16-inch holes may be drilled at 2 inches o.c. approximately for better epoxy penetration. Remove all loose fragments and blow out all dust.
- 3. Protect decayed area from moisture until consolidant has been applied and has completely set. Wood to be consolidated must be dry and have a moisture content of less than 18 percent within 3 inches of the decay area.
- 4. Apply liberally to prepared decay area by pouring, brushing or spraying. Do not allow consolidant to touch adjacent areas, materials or building components. Repeat application 4 to 6 times, or until surfaces cannot accept more epoxy. Allow 1 hour between applications.
- 5. Keep epoxy consolidant out of direct sunlight at temperatures above 60 degrees Fahrenheit until fully cured.

B. Epoxy Patching:

- 1. Consolidate deteriorated woodwork with epoxy, which has been approved by the Architect, prior to performing any patching work.
- 2. Protect all finish surfaces from damaging spills or drips. Immediately remove any spills or drips using solvent as recommended by the manufacturer.
- 3. Prime decayed surfaces according to manufacturer's instructions. Epoxy may be applied by brush or trowel. Saturate the treatment area for a minimum of 1 hour.
- 4. The epoxy filler may be contained during the curing process by constructing temporary forms or molds. Use manufacturer's recommended mold release agent. Potters clay may be used to seal small openings or checks.
- 5. Fill open grain on heavily weathered surfaces, working filler full depth into checks and crevices. Scrape or sand filed areas back to match the surrounding surface.
- 6. Tool, shave or otherwise shape installed patching material as required to match the surface of the surrounding material with no variation in profile and flushness.
- 7. Protect treatment areas from moisture until all epoxy has cured.

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8. Following application, leave all areas clean and free of epoxy. Discard unused epoxy, containers, tools and towels in accordance with local, state and federal environmental regulations.
9. Allow epoxy to cure a minimum of 48 hours at temperatures above 60 degrees Fahrenheit, or for 72 hours at temperatures in the 50 degrees Fahrenheit range. Keep epoxy out of direct sunlight at temperatures above 60 degrees Fahrenheit.

3.04 INSTALLATION OF RESTORED WOODWORK

- A. Reinstall existing components, stops and trim and install new woodwork as required in a neat and workmanlike manner with accurate and tight-fitting joints. All nail heads shall be set below the surface. Dents, splits, gouges, hammer marks and other defects are not acceptable and shall require replacement of the member.
- B. Scribe all trim and millwork to adjacent surfaces. Joints between woodwork and masonry shall be no greater than 1/4 inch. Where woodwork must be scribed to fit adjoining work, prime cut surfaces or repair damaged finish at cuts.

END OF SECTION

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SECTION 08 5313

VINYL WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vinyl-framed, factory-glazed windows with Brick Mold.
- B. Operating hardware
- C. Framed Insect screens.

1.02 RELATED REQUIREMENTS

- A. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2011.
- B. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals; 2011.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- D. ASTM E1423 - Standard Practice for Determining the Steady State Thermal Transmittance of Fenestration Systems; 2014.
- E. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2014.
- F. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.

1.04 SUBMITTALS

- A. Product Data: Provide component dimensions, anchors, fasteners, glass, and internal drainage.
- B. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, installation requirements.
- C. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
 - 1. Evidence of AAMA Certification.
 - 2. Evidence of WDMA Certification.
 - 3. Evidence of CSA Certification.

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4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

D. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) of independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

1.05 WARRANTY

- A. Correct defective Work within a 20 year period after Date of Substantial Completion.
- B. Provide 20 year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Vinyl Windows:
 - 1. Pella Corporation; 350 Series: Casement: www.pellacommercial.com.
 - 2. Pella Corporation; 250 Series Single Hung:

2.02 VINYL WINDOWS

- A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, brick mold, hardware, related flashings, anchorage and attachment devices.
 - 1. Configuration: As indicated on drawings.
 - a. Product Type: H - Hung window, vertically sliding.
 - 2. Color: White.
 - 3. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
 - 4. Weather stripping: Manufacturer's standard resilient type, configured for a flexible fit.
 - 5. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
 - 6. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
 - 7. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.
 - 8. Insect Screens: Tight fitting for operating sash location.
 - 9. Muntin Divider: Manufacturer's standard Muntins to create the appearance of divided lights as indicated in patterns as shown on drawings.
 - 10. Windows shall meet DSHA Standards.
- B. Performance Requirements: Provide products that comply with the following:
 - 1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 - a. Performance Class (PC): R.

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2. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, tested by independent agency and passed in accordance with ASTM E1996 for Wind Zone 3 - Enhanced Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
3. Thermal Transmittance: U-factor of .33 or better, maximum, that includes window glazing and frame system based on average window size required for project and determined in accordance with AAMA 1503, ASTM E1423, or NFRC 100.

2.03 COMPONENTS

- A. Glazing: Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions.
 1. Glass Stops: Snap-on PVC glazing bead with color to match sash and frame, allow for a 4" maximum opening.
- B. Frame Depth: Manufacturer's standard.
- C. Divided Lite Grid: Installed between panes of insulating glass, 5/8 inch (15.9 mm) wide flat metal bars, color to match frame and sash.
 1. Pattern: Custom design, refer to drawings.
- D. Insect Screens: Aluminum, extruded or roll-formed frame with mitered and reinforced corners; apply screen mesh taut to frame; secure to window with hardware to allow easy removal.
 1. Hardware: Manufacturer's standard; quantity as required per screen.
 2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's 18 x 16 mesh.
 3. Frame Finish: Manufacturer's standard, color to match window frame and sash color.
- E. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to maintain weather seal in accordance with AAMA 701/702.
- F. Accessories: Provide related flashings, anchorage and attachment devices as necessary for full assembly.
- G. Glazing Sealant: As specified in Section 08 8000.

2.04 HARDWARE

- A. Sash lock: Lever handle and keeper with cam lock, provide two for each operating sash.
- B. Finish of Exposed Hardware: Baked enamel, match interior sash and frame color.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive this work.

3.02 INSTALLATION

- A. Install window unit assemblies in accordance with manufacturers instructions and applicable building codes.

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- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.
- C. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.
- D. Set sill members and sill flashing in continuous bead of sealant.
- E. Provide thermal isolation where components penetrate or disrupt building insulation. Spray foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

3.03 CLEANING

- A. Remove protective material from pre-finished surfaces.
- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

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SECTION 09 9000

PAINTING & FINISHING

PART 1 - GENERAL

1.01 DESCRIPTION: The work of this Section includes, but is not necessarily limited to, the following items:

- A. Surface preparation of new and existing woodwork and architectural metalwork. Removal of existing items to a controlled environment, thorough cleaning and paint removal, new primer and finish paint application, return and reinstallation in their original locations, may be advisable in lieu of onsite execution of the work.
- B. During or after wood window and door restoration, proper preparation and priming of wood window and door surfaces, and finish painting of all window and door sashes, leafs, frames, sills, and mullions.
- C. Preparation and painting of new wooden shutters.
- D. Storage Shed
 - 1. Full removal of existing flaking and loose paint at siding, trim boards, horizontal and raking fascias, soffits and metal trellis bars.
 - 2. Proper preparation and re-painting of same.

1.02 Related Sections include the following:

- A.
 - 1. Section 04 2001 - Masonry Cleaning and Restoration
 - 2. Section 05 2000 - Architectural Metalwork
 - 3. Section 06 2001 - Carpentry & Wood Restoration
 - 4. Section 07 9000 - Metal Flashing & Sealants
 - 5. Section 08 2000 - Window & Door Restoration

1.03 SUBMITTALS

- A. Product Literature: Submit two copies of manufacturer's product literature for each type of paint and coating specified for the above-mentioned work including technical data, Material Safety Data Sheets and application instructions.
- B. Samples: Submit color chips of the proposed paint or coating manufacturer for color selection by the Engineer. After selection, submit two 6-inch x 6-inch samples of each color and type of paint selected.
- C. Test Panels:
 - 1. Paint one existing wood window, and one existing wood door, and one existing architectural metal, as mock-ups. Completed mock-ups shall be reviewed and approved by the Architect and Owner prior to start of painting on subsequent similar items at the project.

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2. More than one mock-up for each item may be required to be acceptable for approval. The Contractor shall prepare up to three mock-ups of each type, if necessary, without further compensation. Approved test panels shall become part of the work and shall serve as the quality standard for all similar work.

1.04 QUALITY ASSURANCE

- A. The Contractor performing the work of this Section shall have a minimum of five years experience in Architectural painting and shall have successfully completed Architectural painting work on at least five projects of similar scope within the previous three years.

1.05 DELIVERY, HANDLING AND STORAGE

- A. Deliver painting and coating materials to the site in manufacturer's original unopened containers and packaging with product name, type, and color clearly visible.
- B. Store paints, coatings and paint materials and mix only in the area designated by the Contractor for such use. Protect storage area surfaces from spills and splatters by covering floors with heavy drop cloths or tarpaulins. Flammable solvents shall not be stored in the building.
- C. Remove oily or paint-saturated rags and waste from the site each day. Provide a fire extinguisher of proper class for the storage area. All personnel are to be instructed in its use.
- D. Dispose of all packaging, unused paint, and other debris in accordance with local, state, and federal environmental regulations.

1.06 PROJECT CONDITIONS

- A. Surface and ambient temperatures shall be between 50 degrees Fahrenheit and 90 degrees Fahrenheit for application of paint finishes and coatings unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Do not apply paints or coatings in snow, rain, fog or mist, or when humidity exceeds 85 percent. Do not apply paint or coatings to damp or wet surfaces or in direct sunlight unless otherwise permitted by the paint manufacturer's printed instructions.
- C. The Contractor is responsible for protecting existing adjacent materials during the execution of the work. Provide all necessary protection and work procedures to avoid damage to existing material assemblies not a part of the work of this Section. At a minimum, the Contractor shall:
 1. Protect adjacent surfaces and surrounding materials from paint drips and splatters with drop cloths or other protective coverings as required during painting operations.
 2. Properly mask all windows and other surfaces not to be painted or coated when performing work on adjacent surfaces.
- D. If areas are necessarily blocked, the Contractor shall provide alternate routes for owner and other contractor traffic around the work areas.

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PART 2 - PRODUCTS

2.01 PRODUCT QUALITY

- A. Paint and finish materials shall be of best quality, professional grade standard products as specified and produced by the listed manufacturer(s). Finish materials shall be compatible with substrates and primers specified. Products of equal quality of other listed manufacturers will be considered approved for use.
- B. Provide primers and other undercoat paints shall be factory formulated products produced by the same manufacturer as finish coats that are compatible with the substrate and finish material specified. Use only thinners approved by the paint manufacturer and use only within recommended limits. No drying accelerators shall be added on site.
- C. Paints shall be factory color-mixed.
- D. Paints and primers shall be solvent thinned or water-based materials as indicated.

2.02 MANUFACTURERS:

- A. Basis of Design: Benjamin Moore
- B. Subject to compliance with requirements, other acceptable manufacturers offering products that may be incorporated into the Work include the following:
 - 1. Benjamin Moore
 - 2. Sherwin-Williams Co.
 - 3. M. A. Bruders & Sons Company (MAB Duron, ICI, M. Buten & Sons, PPG Industries)

2.03 AUXILIARY MATERIALS

- A. Filler for painted metal surfaces shall be steel filled, two-component epoxy metal filler, putty grade.
- B. Equipment for removing paint from steel: wire brush (non-ferrous metal brush such as brass) and dry grit blasting (fine grit at 80-100 psi)
- C. Paint Removers
- D. Wood Fillers
- E. Cleaning Agents (TSP)

PART 3 - EXECUTION

3.01 GENERAL PAINTING INSTRUCTIONS

- A. Surface Preparation:
 - 1. Existing Metal Surfaces
 - a. Existing steel and ferrous metal surfaces shall be cleaned of loose paint, dirt, grease, corrosion, and scale by hand tool cleaning (SSSPC-SP2), power tool

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cleaning (SSSPC-SP3), and solvent cleaning (SSSPC-SP1) as required by conditions. Coat with rust inhibitive primer same day to discourage rust bloom. See Finishing Schedule for primer and finish coatings.

2. Existing Wood Surfaces
 - a. Remove all loose and poorly adhered paint, dirt, mildew, and other foreign material from surfaces to be painted. Sand all bare wood, and remaining paint, feathering edges of existing paint layers, and scuffing the surfaces of all existing paint to enhance the mechanical adhesion of new primer. Spot prime all bare wood surfaces resulting from preparation. Then prime again - 100% of the wood surfaces again, over existing paint and newly applied primer.
 - b. Existing wood surfaces shall be repaired per Section 06250 Wood Restoration and Section 08200 Wood Window & Door Restoration, then scraped, open grain wood shall be filled with epoxy fillers, and entire wood surfaces shall be sanded with 100 grit sandpaper. Spot prime all bare wood surfaces (after restoration) then prime again 100% of the window surfaces again, over existing paint and newly applied primer.
 - c. New wood surfaces shall be sanded with 220 grit sandpaper. Remove dust and 100% prime all bare wood surfaces and allow for drying time as recommended by the manufacturer. Apply putties and fillers between primer and finish coat. Then apply two finish coats finish, of specified finish products, allowing for drying time between coats, as recommended / required by the manufacturer.
3. Surfaces shall be as recommended by and acceptable to the paint manufacturer for application of the manufacturer's paint, coating system or finish, and acceptable to the Architect / Owner prior to beginning paint application.

B. Finish Application:

1. Mix and prepare painting materials in accordance with manufacturer's directions.
2. Apply paint in accordance with manufacturer's directions. Use techniques best suited for substrate and type of material being applied.
3. Do not paint over dirt, rust, scale, grease, moisture, or other conditions detrimental to the formation of a durable paint film.
4. Apply material evenly without runs, sags or other defects. Leave moldings, trim, ornaments, and edges clean and true to details without excess paint in corners or depressions. Make edges of paint adjoining other materials or colors sharp and clean, without overlaps.
5. Each coat shall be checked and any imperfections, faulty material, poor workmanship, etc. shall be corrected before applying succeeding coat. Cloudiness, spotting, holidays, laps, runs, sags, or other surface imperfections will not be acceptable.
6. Apply additional coats when undercoats or other conditions show through the final coat of paint, until the paint film is of uniform finish color and appearance. Give special attention, to ensure that all surfaces, including edges, corners and crevices receive a dry film thickness equivalent to that of flat surfaces.
7. Puttying and Sealant work shall be completed after prime coat has been applied and prior to finish coats.
8. Do not apply succeeding coats until undercoat is thoroughly dry. Allow at least the minimum drying time recommended by the manufacturer. Sand lightly between coats to ensure adhesion of successive coats.

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3.02 PAINTING AND FINISHING SCHEDULE

- A. Exterior Metalwork in the field (ferrous metal louver grilles, and other items):
 - 1. Primer -- 1 primer coat of Benjamin Moore Alkyd Metal Primer P96
 - 2. Finish -- 2 finish coats of exterior acrylic enamel, Benjamin Moore Moorgard Exterior Low Luster House Paint N103.
 - 3. Color: Black.
- B. Exterior Metalwork in the shop (ferrous metal guards, handrails, and other items):
 - 1. Primer - shop preparation for powder cost.
 - 2. Finish - Electrically applied powder coating per manufacturer's standards.
 - 3. Color: Black.
- C. Exterior Woodwork, Windows & Doors (New and existing materials):
 - 1. Primer -- 1 primer coat Benjamin Moore Fresh Start Exterior Alkyd Primer 100-00.
 - 2. Finish -- 2 finish coats of Benjamin Moore Regal Select Exterior Low Luster House Paint N401, exterior acrylic satin-gloss enamel.
 - 3. Colors to be determined by the Architect / Owner. Tint primer with one-half of the color formula of the finish coat
- D. Exterior Naturally Durable Woods:
 - 1. Sealer / Wood Preparer - Benjamin Moore Selection needed.
 - 2. Stain - Benjamin Moore Selection needed
- E. DO NOT PAINT:
 - 1. Masonry Unless otherwise noted (see other section for coatings).
 - 2. Exterior Parging
 - 3. Glass.
 - 4. Factory Finishes: Metals such as brass, bronze, or aluminum unless otherwise noted.

3.03 PROTECTION AND CLEANUP

- A. Protect the work of others from damage by the materials, equipment or tools used for the painting operations. Damage repair shall be at the Contractor's expense.
- B. Upon completion of the painting and coating, remove excess paint materials, drop cloths and other protective materials and debris from the site.
- C. Clean paint spots from all surfaces not scheduled to receive paint, such as masonry, glass, finish hardware, etc., leaving all surfaces in a satisfactory condition.

3.04 Owner's Stock

- A. Leave on premises, where directed by Owner, not less than 2 gallons of each type of finish paint used. Containers shall be tightly sealed and clearly labeled for identification.

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SECTION 09 9113

EXTERIOR PAINTING

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, and varnishes.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Exposed surfaces of steel lintels and ledge angles.
 - 3. Mechanical, Plumbing, and Electrical:
 - a. On the roof and outdoors, paint equipment that is exposed to weather or to view, including factory-finished materials. Paint to match surrounding finishes.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items indicated to remain unfinished.
 - 2. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 3. Floors, unless specifically indicated.
 - 4. Glass.
 - 5. Concealed pipes, ducts, and conduits.
 - 6. Refer to DSHA standards in Division 1.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

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1.04 Maintenance Materials

- 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 of quantity used, but not less than 1 gallon of each material and color applied.
 2. Coating Maintenance Manual: Upon conclusion of the project, the Contractor shall furnish a coating maintenance manual, such as "Sherwin-Williams Summary with finish schedule, area detail designating where each product/ color/ finish was used, product data pages, Material Safety Data Sheets, Care and cleaning instructions, touch up procedures, and color samples of each color and finish used.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Base Manufacturer: Sherwin-Williams Company.
 - 2. Behr Process Corporation: www.behr.com/#sle.
 - 3. Benjamin Moore & Co: www.benjaminmoore.com.
 - 4. Diamond Vogel Paints: www.diamondvogel.com/#sle.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience. For each coat in a paint system, provide products recommended in writing by the manufacturers of top coat for use in paint system and on substrate indicated.
 - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.

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2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
3. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated, Including concrete, concrete masonry units, brick, cement board, primed wood, and primed metal.
 1. Two top coats and one coat primer.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

4.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 2. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
 3. Concrete Floors and Traffic Surfaces: 8 percent.

4.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

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- D. Seal surfaces that might cause bleed through or staining of topcoat.
 - E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
 - F. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - G. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
 - H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
 - I. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - J. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
 - K. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SPI.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
 - L. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied. Back prime concealed surfaces before installation.
 - M. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
 - N. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with tinted primer.
 - O. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.
- 4.03 APPLICATION
- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

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- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

4.04 FIELD QUALITY CONTROL

- A. Owner will provide field inspection.
- B. Testing of Paint Materials
 - 1. Owner reserves the right to invoke the following procedure:
 - a. The Owner will engage the services of a qualified testing agency to sample paint materials. The Contractor will be notified in advance and may be present when samples are taken. If paint materials have been delivered to the Project site, samples may be taken. Samples will be identified, sealed and certified by testing agency. Owner may also test Dry film thickness.
 - b. Testing Agency will perform tests for compliance with product requirements.
 - c. Owner may direct the Contractor to stop applying paints if materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site. The previously painted areas will be repainted with the complying product.
 - d. If testing shows that dry film thickness of applied paint does not comply with the manufacturer's written recommendations, Contractor shall apply additional coats, as needed, to comply with the manufacturer's written recommendations.
 - e. If testing reveals any deficiencies in the painting the Contractor will pay the costs incurred by the owner for testing and restore any areas damaged by the testing.

4.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from 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.

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- 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 undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

4.06 SCHEDULE - PAINT SYSTEMS- LOW voc

- A. Concrete, Concrete Masonry Units (CMU), Concrete Block, Brick Masonry: Finish surfaces exposed to view.
 - 1. Exterior: CE-OP-3A, Semi-Gloss Acrylic.
 - a. One coat Prep Rite Interior/ Exterior block filler B25 W25
 - b. Semi Gloss- 2 coats of Latex Enamel
 - 1) Sherwin-Williams A-100 Semi-gloss
- B. Wood: Finish surfaces exposed to view.
 - 1. Exterior trim and frames: WE-OP-3A.
 - a. Primer: Wood Primer; One coat Exterior Latex Wood Primer
 - b. Finish: Two coats A-100 Semi-Gloss
 - c. Sherwin-Williams
 - 2. Exterior siding: WE-TR-S.
 - a. Primer: Wood Primer; One coat Exterior Latex Wood Primer-For factory primed composite siding, primer may be omitted.
 - b. Finish: Two coats A-100 Semi-Gloss
 - c. Sherwin-Williams
 - 3. Wood Doors: WI-TR-VS.
 - a. Primer: Wood Primer; One coat Exterior Latex Wood Primer
 - b. Finish: Two coats A-100 Semi-Gloss
 - c. Sherwin-Williams
- C. Shop Primed Steel Fabrications: Finish surfaces exposed to view.
 - 1. Exterior: ME-OP-3A, semi-gloss; finish all surfaces, including concealed surfaces, before installation.
 - a. Primer: Pro Industrial Pro-Cryl Universal Primer
 - b. Finish: Two coats Pro Industrial DTM Acrylic , semi-gloss B66 series
 - 1) Sherwin-Williams
- D. Galvanized Steel: Finish surfaces exposed to view.
 - 1. Exterior: Paint MgE-OP-3A, semi-gloss. Pretreat as required by manufacturer.
 - a. Pro Industrial Pro-Cryl Universal Primer
 - b. Finish: Two coats Pro Industrial DTM Acrylic , semi-gloss B66 series
 - c. Sherwin-Williams
- E. Exterior Pavement Markings: Paint E-Pav.
 - 1. One Coat-Latex Traffic Paint, New: High Gloss Latex Enamel
 - 2. Sherwin Williams ProPark Waterborne Marking Paint
- F. Fiberglass and PVC Plastic, New: High Gloss Latex Enamel

1. Primer: One Coat Multi-purpose Primer, B51.
2. Finish: Two coats Pro Industrial High Performance Acrylic gloss, B66-600 Series.
 - a. Sherwin-Williams

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SECTION 09 9820

CONCRETE FLOOR SEALER

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PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and other Contract Documents, listed in the agreement between the Owner and Contractor, apply to this Section.

1.02 SUMMARY

- A. Section includes:
 - 1. Concrete sealer for:
 - a. Uncured concrete floors.
 - b. Cured concrete floors.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Provide data on specified products, describing physical and performance characteristics.
- B. Manufacturer's Installation Instructions:
 - 1. Submit surface preparation and application instructions.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with a minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept concrete sealer on site in manufacturer's original unopened containers. Inspect for damage.
- B. Protect concrete sealer from freezing.

1.06 1.6 PROJECT CONDITIONS

- A. Do not install concrete sealer when air temperature or concrete surface temperature is less than 40 degrees F
- B. Maintain concrete floor surface temperature above freezing during and after installation of concrete sealer until sealer is cured.

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PART 2 PRODUCTS

2.01 MATERIALS

- A. Manufacturers:
 - 1. Mar-flex; SurfSeal.
 - 2. Concure Systems
 - 3. L&M Construction Chemicals, Inc.; Seal Hard.
 - 4. Vexcon Chemicals; StarSeal PS.
 - 5. Substitutions: In accordance with Contract Documents.

- B. Cure-Seal-Hardener: Water-based chemically reactive penetrating sealer and hardener that seals by densifying concrete so that water molecules cannot pass through but air and water vapor can, and allows concrete to achieve full compressive strength, minimizing surface crazing and eliminating dusting

PART 3 EXECUTION

3.01 EXAMINATION - UNCURED CONCRETE FLOORS

- A. Verify final troweling is complete.
- B. Verify concrete is set sufficiently so application of concrete sealer will not mar concrete surface.

3.02 EXAMINATION - CURED CONCRETE FLOORS

- A. Verify floor surfaces are free of substances that may impair penetration of concrete sealer.

3.03 PREPARATION - CURED CONCRETE FLOORS

- A. Remove membrane forming curing compounds and other surface contaminants capable of impairing concrete sealer penetration into concrete.
- B. Remove contaminants by chemical or mechanical means as recommended by concrete sealer manufacturer.
- C. Allow floor to dry. Broom clean floor surface to remove loose dust and dirt.

3.04 INSTALLATION - UNCURED CONCRETE FLOORS

- A. Apply concrete sealer in accordance with manufacturer's instructions immediately after final troweling.
- B. Keep surface wet with cure-seal-hardener for a minimum soak-in period of 30 minutes without allowing it to dry out or become slippery. In hot weather, slipperiness may appear before the 30 minute time period has elapsed. If that occurs, apply additional cure-seal-hardener as needed to keep the entire surface in a non-slippery state for the first 15 minutes. For the remaining 15

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minutes, mist the surface as needed with water to keep the material in a non-slippery state. In hot weather conditions, follow manufacturer's special application procedures.

- C. When the treated surface becomes slippery after this period, lightly mist with water until slipperiness disappears.
- D. Wait for surface to become slippery again, and then flush entire surface with water to remove all cure-seal-hardener residue.
- E. Squeegee surface completely dry, flushing any remaining slippery areas until no residue remains.
- F. Wet vacuum or scrubbing machines can be used in accordance with manufacturer's instructions to remove residue.
- G. Saw Cut Floor Joints: Treat joints after cutting as specified in Section 03300.
 - 1. Remove cement dust from joints and floor surface.
 - 2. Treat saw cut joints by flooding with concrete sealer.
 - 3. When curing is complete, clean joints in preparation for sealant application as specified in Section 07900.

3.05 INSTALLATION - CURED CONCRETE FLOORS

- A. Apply concrete sealer in accordance with manufacturer's instructions.
- B. Saturate surface with cure-seal-hardener; re-spray or broom excess onto dry spots.
- C. Keep floor surface wet with concrete sealer for minimum 30 minute soak-in period, remove all excess material, especially from low spots, using broom or squeegee.
- D. Broom or squeegee concrete sealer into concrete surface in accordance with manufacturer's installation instructions.
- E. Remove excess liquid material from floor surface.
- F. Flush with water, removing all cure-seal-hardener residue. Squeegee completely dry, flushing any remaining slippery areas until no residue remains.

3.06 PROTECTION OF FINISHED WORK

- A. Protect installed floors for at least 3 months until chemical reaction process is complete.
- B. Prohibit traffic on floor finish for 8 hours after installation.

3.07 CLEANING

- A. Remove concrete sealer residue from floor surface.

END OF SECTION

Architectural Alliance, Inc
Wilmington, DE

DSHA Office Renovations
Dover, DE

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