

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and Drawing conventions.
9. Permits, Fees, and Notices.
10. Reference Standards
11. Special Requirements
12. Existing Systems Affected by the Work

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: Howard County Public School System Three School Select Door Replacements.

1. Project Location:

- a. School 1: Centennial Lane Elementary School, 3825 Centennial Lane, Ellicott City, MD 21042
- b. School 2: Waterloo Elementary School, 5940 Waterloo Road, Columbia, MD 21045
- c. School 3: Worthington Elementary School, 4570 Roundhill Road, Ellicott City, MD 21043

- B. Owner: Howard County Public Schools Building Services, 9020 Mendenhall Court, Suite A, Columbia, MD 21045.

1. Owner's Representative: Mr. Tony Bonomo, HCPSS Building Services, 9020 Mendenhall Court, Suite A, Columbia, MD 21045, 410-313-7084.

- C. Architect: SM+P Architects, 1100 Cathedral Street, Baltimore, MD 21201, 410-685-3582.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. The Work includes, but is not limited to, all work necessary for the replacement of doors, door frames, and door hardware at multiple openings at three schools including touch-up of adjacent finishes disturbed by replacement work. The Work also includes the repair of multiple concrete landings, the construction of new wall infill where indicated on the drawings, installation of new card readers where indicated on the drawings, and other Work indicated in the Contract Documents.
- B. Type of Contract:
 - 1. Project will be constructed under a single prime contract.

1.5 PHASED CONSTRUCTION

- A. The Work shall be conducted in a single phase.

1.6 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1.7 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 2. Provide not less than **one week** notice to Owner of activities that will affect Owner's operations.
 3. The Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied in each school prior to Owner occupancy.
 4. The Contractor shall obtain a Certificate of Occupancy from local building officials based upon the Contractor's Final Inspection Certificates. Final Inspection Certificates are required prior to Owner occupancy.
 5. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain such mechanical and electrical systems serving occupied portions of the building.
 6. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions of the building.
 7. At the time of Owner occupancy, should mechanical and electrical systems not be fully operational and not have been successfully demonstrated, the Contractor may be called upon by the Owner to respond within 4 hours to resolve the problem or issues, or to complete the particular Work immediately. If the Work is not completed immediately, the Owner may temporarily resolve the problem or issues, or complete the Work, or have others complete the Work at the Contractor's expense without relieving the Contractor of any of his contractual obligations.

1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: The Contractor shall furnish sufficient forces to ensure the completion of the Work within the time stated in the Contract. Any work necessary to be performed outside the working hours listed below, on Saturdays, Sundays, or legal holidays, shall be performed without additional expense to the Board of Education. In addition, should the Contractor perform work requiring the attendance of Howard County Public School personnel or custodians at times other than their typical work hours, the owner will bear such additional costs as necessary to pay the wages of the Howard County Public School personnel.
1. Coordinate with the Owner for specific Work hours for the Project. Work hours shall be determined and may vary such that there are no interruptions to Student activities.
- C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than seven days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.

- D. Restricted Substances: The Owner maintains a tobacco and alcohol/drug-free environment.
 - 1. The sale or use of tobacco, alcohol, or drugs in any form or related product is prohibited on the Owner's property at all times.
 - 2. Persons found to violate this policy may be requested to remove the product in question and themselves from the premises.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

1.11 PERMITS, FEES, AND NOTICES

- A. The Contractor shall pay for all permits required by law or the Contract Documents for the execution of this work unless noted otherwise after notification from the Architect that the Building Permit has been review and approved by the Authority Having Jurisdiction. The Owner will reimburse the Contractor for actual permit costs (no mark-up).
- B. The contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.
- C. The Contractor shall pay legally required sales, consumer, and use taxes.

1.12 REFERENCE STANDARDS

- A. For products specified with association or trade standards, comply with the requirements of the standards, except when more rigid requirements are specified or required by applicable codes.
- B. Comply with the standard in effect as of the Bid Date, except when a specific date is specified.

1.13 SPECIAL REQUIREMENTS

A. Fire Protection: The Contractor shall:

1. Provide and maintain approved portable 15 lb / 20 BC rated fire extinguishers at all appropriate locations during construction.
2. Avoid accumulation of flammable debris and waste within the building and vicinity.
3. Store flammable or volatile liquids in the open or in small detached structure or trailers. Handle liquids with low flash points that are to be used within the building in approved safety cans. Supervise closely the storage of paint materials and other combustible finishing and cleaning products. Do not permit oily rags to be stored in closets or other tight permanent spaces.
4. Prohibit smoking in the vicinity of hazardous operations and locations. Post suitable "No Smoking" signs in these areas.
5. Closely supervise welding and torch cutting operations near combustible materials.
6. Use only fire-resistant building paper, plastic sheet, and tarpaulins for temporary protection.
7. Do not store combustible material outdoors within 10 feet of a building or structure.
8. Do not use gasoline for cleaning within the building under any circumstances.
9. Do not burn any trash or other material on site.
10. Take other precautions suitable for hazardous conditions at the site to prevent fire.

B. Accident Prevention and Safety: The Contractor shall:

1. Comply with all applicable laws, ordinances, rules, regulations and orders of governing authorities having jurisdiction for the safety of persons and property to protect them from damage, injury or loss.
2. Erect and maintain, as required by conditions and progress of the work, all necessary safeguards for safety and protection, including fences, railings, barricades, lighting, posting of danger signs and other warnings against hazards.
3. Be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with his contract.
4. Cooperate fully with the Indoor Air Quality requirements.
5. Comply fully with the latest Environmental Protection Agency 40 CFR Part 745 Lead Renovation, Repair and Painting Regulations.
 - a. All testing required for the presence of lead base paint will be done by the Contractor.
 - b. Required notification and cleaning verification will be done by the Contractor.
6. Material Safety Data Sheets: The Contractor shall provide Material Safety and Data Sheets on all items prior to commencement of work. The Contractor shall designate a common location on the construction site where all independent contractors or employers shall have a chemical information list before the commencement of work.
7. All testing required for the presence of asbestos will be done by the Contractor. Required notification and cleaning verification will be done by the Contractor.
8. The Contractor shall provide constant protection to maintain work, materials, apparatus and fixtures free from injury and damage by rain, snow, wind, storms, frost, or heat and shall cover work likely to be damaged at the end of each day's work.
 - a. The Contractor shall remove work damaged due to failure to provide specified protection and replace at no additional cost to the Owner.

1.14 EXISTING SYSTEMS AFFECTED BY THE WORK

- A. Prior to commencement of construction, the Owner will advise the Contractor of the operating capabilities of those portions of any systems that may remain and, at the Contractor's option, will demonstrate to the Contractor the operating capabilities of these systems, which will be considered first class if not demonstrated.
- B. During construction, the Contractor will make every effort to protect existing systems, including, but not limited to, providing temporary supports for devices located in ceilings to be removed, providing plastic bags for protection of devices from dust and debris, and repositioning of system wiring to avoid damage.
- C. When the replacement acoustical ceiling is sufficiently complete for the purpose, reinstall all devices, wiring, and sprinklers previously removed or relocated. Repair and/or replace any damaged equipment. Restore systems to operating capabilities as determined prior to construction.
- D. In the presence of the Owner, demonstrate final system operating capabilities equal to capabilities determined prior to commencement of construction.

1.15 PROJECT SCHEDULE

- A. Major construction milestones shall be as scheduled below. Should the contractor fail to complete major milestones as scheduled, the owner may issue a cure notice or take any action deemed necessary to return the delayed major milestones and any related successor functions back on schedule, as soon as possible, at the contractor's expense.
- B. The contractor shall develop a detailed project schedule, approximately sequencing all required work, including shop drawing submittals, equipment fabrication periods, etc.
- C. Major construction milestones shall be as follows (based on a 4/16/20 contract award):
 - a. 04/16/20 Contract award
 - b. 04/30/20 Submittals due
 - c. 05/07/20 Order equipment
 - d. 06/18/20 Start construction (pending school availability)
 - e. 06/22/20 Summer break
 - f. 08/28/20 Complete construction

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

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

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Centennial Lane Elementary School:

1. Base Bid: All demolition and new work for openings and adjacent finishes at the following openings:
 - a. CL-102
 - b. CL-103
 - c. CL-106
 - d. CL-107
 - e. CL-108
 - f. CL-109
 - g. CL-111 (A&B)
 - h. CL-112
 - i. CL-113
 - j. CL-114
2. Alternates: Bidders shall assume that the Work for any Alternates selected by the Owner shall be performed at the same time as the Base Bid Work.
 - a. Alternate Number 01: All demolition and new work for openings and adjacent finishes at opening CL-101
 - b. Alternate Number 02: All demolition and new work for openings and adjacent finishes at opening CL-104
 - c. Alternate Number 03: All demolition and new work for openings and adjacent finishes at opening CL-105
 - d. Alternate Number 04: All demolition and new work for openings and adjacent finishes at opening CL-110
 - e. Alternate Number 05: All demolition and new work for openings and adjacent finishes at Opening CL-115.
 - f. Alternate Number 06: The Owner is bidding three projects of similar scope at the same time. These projects are indicated in the drawings and specifications and are located at Centennial Lane Elementary School, Waterloo Elementary School, and Worthington Elementary School. Bidders shall indicate a percentage discount, which will be applied to each project awarded, if they are awarded two or more projects.

B. Waterloo Elementary School:

1. Base Bid: All demolition and new work for openings and adjacent finishes at the following openings:
 - a. WL-101
 - b. WL-102
 - c. WL-103 (A&B)
 - d. WL-104
 - e. WL-105
 - f. WL-106
 - g. WL-107

- h. WL-111
 - i. WL-118
 - j. WL-121
 - k. WL-122
2. Alternates: Bidders shall assume that the Work for any Alternates selected by the Owner shall be performed at the same time as the Base Bid Work.
- a. Alternate Number 01: All demolition and new work for openings and adjacent finishes at opening WL-108
 - b. Alternate Number 02: All demolition and new work for openings and adjacent finishes at opening WL-109
 - c. Alternate Number 03: All demolition and new work for openings and adjacent finishes at opening WL-110
 - d. Alternate Number 04: All demolition and new work for openings and adjacent finishes at opening WL-112
 - e. Alternate Number 05: All demolition and new work for openings and adjacent finishes at opening WL-113
 - f. Alternate Number 06: All demolition and new work for openings and adjacent finishes at opening WL-114
 - g. Alternate Number 07: All demolition and new work for openings and adjacent finishes at opening WL-115
 - h. Alternate Number 08: All demolition and new work for openings and adjacent finishes at opening WL-116
 - i. Alternate Number 09: All demolition and new work for openings and adjacent finishes at opening WL-117
 - j. Alternate Number 10: All demolition and new work for openings and adjacent finishes at opening WL-119
 - k. Alternate Number 11: All demolition and new work for openings and adjacent finishes at opening WL-120
 - l. Alternate Number 12: The Owner is bidding three projects of similar scope at the same time. These projects are indicated in the drawings and specifications and are located at Centennial Lane Elementary School, Waterloo Elementary School, and Worthington Elementary School. Bidders shall indicate a percentage discount, which will be applied to each project awarded, if they are awarded two or more projects.

C. Worthington Elementary School:

1. Base Bid: All demolition and new work for openings and adjacent finishes at the following openings:
- a. WT-101
 - b. WT-102
 - c. WT-108
 - d. WT-116
 - e. WT-121
 - f. WT-122
 - g. WT-123
 - h. WT-124
 - i. WT-125
 - j. WT-126
 - k. WT-127
 - l. WT-128
 - m. WT-129
 - n. WT-130
 - o. WT-131 (A&B)

- p. WT-132
 - q. WT-133
2. Alternates: Bidders shall assume that the Work for any Alternates selected by the Owner shall be performed at the same time as the Base Bid Work.
- a. Alternate Number 01: All demolition and new work for openings and adjacent finishes at opening WT-103
 - b. Alternate Number 02: All demolition and new work for openings and adjacent finishes at opening WT-104
 - c. Alternate Number 03: All demolition and new work for openings and adjacent finishes at opening WT-105
 - d. Alternate Number 04: All demolition and new work for openings and adjacent finishes at opening WT-106
 - e. Alternate Number 05: All demolition and new work for openings and adjacent finishes at opening WT-107
 - f. Alternate Number 06: All demolition and new work for openings and adjacent finishes at opening WT-109
 - g. Alternate Number 07: All demolition and new work for openings and adjacent finishes at opening WT-110
 - h. Alternate Number 08: All demolition and new work for openings and adjacent finishes at opening WT-111
 - i. Alternate Number 09: All demolition and new work for openings and adjacent finishes at opening WT-112
 - j. Alternate Number 10: All demolition and new work for openings and adjacent finishes at opening WT-113
 - k. Alternate Number 11: All demolition and new work for openings and adjacent finishes at opening WT-114
 - l. Alternate Number 12: All demolition and new work for openings and adjacent finishes at opening WT-115
 - m. Alternate Number 13: All demolition and new work for openings and adjacent finishes at opening WT-117
 - n. Alternate Number 14: All demolition and new work for openings and adjacent finishes at opening WT-118
 - o. Alternate Number 15: All demolition and new work for openings and adjacent finishes at opening WT-119
 - p. Alternate Number 16: All demolition and new work for openings and adjacent finishes at opening WT-120
 - q. Alternate Number 17: The Owner is bidding three projects of similar scope at the same time. These projects are indicated in the drawings and specifications and are located at Centennial Lane Elementary School, Waterloo Elementary School, and Worthington Elementary School. Bidders shall indicate a percentage discount, which will be applied to each project awarded, if they are awarded two or more projects.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided in Project Manual.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific

- features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 15 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule, including:
 - a. Contractors Construction Schedule.
 - b. Application for Payment (use AIA format).
 - c. IAC Requisition Forms
 - d. List of Subcontractors
 - e. List of Principal Suppliers and Fabricators (Purchase Orders).
 - f. List of Products
 - g. Schedule of Submittals.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.

- b. Name of Architect.
 - c. Architect's Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
- 2. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
- 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
- 4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 - b. Items stored off-site: Include property "all-risk" insurance certificates, identifying products and dollar values, and naming the Owner as an additional insured.
 - c. Include signed delivery tickets and invoices for items stored on-site.
- 5. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner. AIA G702 form, line 7, "LESS PREVIOUS CERTIFICATES FOR PAYMENT" on the current AFP must be the exact same value as line 6, "TOTAL EARNED LESS RETAINER" on the prior AFP. If these values are not the same, the current AFP will be returned without action. Generally, if items requisitioned are not complete, the requisition will be held until all requisitioned items are complete. At the Owners option, he may authorize payment of a lesser amount and pay such balance after the incomplete items are completed. It is the Contractor's responsibility to provide all information required on his Schedule of Values and to properly requisition for completed Work so that payments may be processed expeditiously.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 and IAC/PSCP Form 306.4 as the basic form for Applications for Payment and Owner's IAC Reimbursement, respectively, as attached in this manual. Distribute items as required for each Form from the detailed Schedule of Values.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Incomplete applications will be returned without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit draft copies of Applications for Payment via email in PDF format. After approval of draft copies, submit four signed and notarized original copies of each Application for Payment: original and one copy to the Owner, one copy to the Architect, and one copy to the Engineer by a method ensuring receipt within 24 hours]. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.

9. Report of preconstruction conference.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, Contract Compliant Based, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. Administrative actions and submittals that shall proceed this application include:
 1. Occupancy permits and similar approvals.
 2. Warranties (guarantees) and maintenance agreements.
 3. Test/adjust/balance records.
 4. Maintenance instructions.
 5. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. Evidence that claims have been settled.
 5. Transmittal of required Project construction records to Owner.
 6. Proof that taxes, fees and similar obligations have been paid.
 7. Removal of temporary facilities and services.
 8. Removal of surplus materials, rubbish and similar elements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Project meetings.
 - 5. Surveying / Recording
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

1.5 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. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or 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 functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such

conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
7. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.

5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to the Contract modification requirements within the Contractor's contract with the Owner.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within seven days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.

7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than seven days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Preparation of Record Documents.
 - m. Use of the premises and existing building.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.
 - x. First aid.

- y. Security.
 - z. Progress cleaning.
 - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning,

coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of Proposal Requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.9 SURVEY / RECORDING

- A. **General: Calculate dimensions and measure for layout of work; do not scale the drawings. Verify existing conditions regarding door & frame size, door & frame type, door handing, etc. Record deviations (if any) from drawing information on existing conditions, and review with Architect/Engineer at time of discovery.**
- B. Installation Inspections: Inspect conditions for installation, and report (in writing) unsatisfactory conditions. Correct unsatisfactory conditions before proceeding. Inspect each product

immediately before installation. Do not install damaged or defective products, materials or equipment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Construction schedule updating reports.
 - 3. Daily construction reports.
 - 4. Site condition reports.
 - 5. Responsibility for Completion

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
 2. PDF file. Paper copies may be requested by the Owner or Architect.
- B. Startup construction schedule.
1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Existing Conditions Photographs: The Contractor shall photograph the interior and exterior of each opening in the work area to establish a record of the existing conditions of the surroundings at each opening. Disturbed finishes around any opening not recorded as an existing condition shall be repaired by the Contractor at no expense to the Owner.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Daily Construction Reports: Submit at weekly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.

1.5 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than 15 days for completion of punch list items and final completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Installation.
 - g. Adjusting.
 - h. Curing.
 - i. Building flush-out.
 - j. Startup and placement into final use and operation.
 - k. Commissioning.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.

2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.

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

H. Recovery Schedule: When periodic update indicates the Work is seven or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

I. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

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

1.7 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within seven days of date established for commencement of the Work.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

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

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in [10] <Insert number> percent increments within time bar.

1.8 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.

2. Approximate count of personnel at Project site.
 3. Equipment at Project site.
 4. Material deliveries.
 5. High and low temperatures and general weather conditions, including presence of rain or snow.
 6. Accidents.
 7. Meetings and significant decisions.
 8. Unusual events.
 9. Stoppages, delays, shortages, and losses.
 10. Emergency procedures.
 11. Orders and requests of authorities having jurisdiction.
 12. Change Orders received and implemented.
 13. Construction Change Directives received and implemented.
 14. Equipment or system tests and startups.
 15. Partial completions and occupancies.
 16. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.9 RESPONSIBILITY FOR COMPLETION

- A. The Contractor agrees that whenever it becomes apparent from the progress schedule that the Contract completion date will not be met, he will take some or all of the following actions at no additional cost to the Owner.
1. Increase construction manpower in such quantities and craft as will substantially eliminate, in the judgment of the Construction Manager, the backlog of work.
 2. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination that will substantially eliminate, in the judgment of the Construction Manager, the backlog of work.
 3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.
- B. Failure of the Contractor to comply with these requirements shall be a basis for determination by the Owner that the Contractor is not prosecuting the work with such diligence as will ensure completion within the time stipulated. Upon such determination, the Owner may take such action as may be deemed appropriate including withholding of progress payments otherwise due and/or supplementing the Contractor's efforts at the Contractor's expense.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

- B. Related Requirements:

- 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
 - 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 5. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.

1.3 DEFINITIONS

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

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule or within 14 days of date established for commencement of work. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect and Construction Manager on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

E. Paper Submittals: Where Electronic Submittals are impractical or inappropriate, place a permanent label or title block on each submittal item for identification.

1. Include the information listed for PDF submittals with any paper submittals.
2. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner will return without review submittals received from sources other than Contractor.

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 10 days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.

- e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
- 3. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
- 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
- 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - 2. Manufacturer and product name, and model number if applicable.
 - 3. Number and name of room or space.
 - 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Certificates:

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

G. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.8 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp on the submittal cover sheet included in the PDF of each submittal. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
 - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action, as follows:
 - a. Approved: Submittal is accepted and can be incorporated into the work.
 - b. Approved as Notes: Submittal is conditionally accepted subject to inclusion of items noted.
 - c. Revise and Resubmit: Submittal is not accepted and must be resubmitted.
 - d. Rejected: Submittal is unacceptable
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 013516 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes special procedures for alteration work.

1.3 DEFINITIONS

- A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. Consolidate: To strengthen loose or deteriorated materials in place.
- C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- K. Retain: To keep existing items that are not to be removed or dismantled.
- L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.4 COORDINATION

- A. Schedule construction operations in sequence required to obtain best Work results.
- B. Coordinate sequence of alteration work activities to accommodate the following:
 - a. Owner's continuing occupancy of portions of existing building.
 - b. Security of the building throughout construction
- C. Give advance notice for unusual operations, interruption of services, and use of heavy noise producing equipment.
- D. Examine existing construction affected; determine interdependence of components.
- E. Provide necessary temporary measures to preserve integrity of existing work to remain.
- F. When concealed or unknown conditions at variance with the Contract Documents are encountered during operations, report conditions and obtain further instructions before proceeding.

1.5 MATERIALS OWNERSHIP

- A. Do not assume that any equipment, materials, or other items of value will become the Contractor's property. Those items declared "Debris" or "Excess" will become the property of the Contractor and must be removed from the site.

1.6 INFORMATIONAL SUBMITTALS

- A. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

1.7 QUALITY ASSURANCE

- A. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.
- B. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.8 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:
 - 1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
 - 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F or more above the dew point.

E. Storage Space:

1. Owner will arrange for limited on-site location(s) for free storage of salvaged material. This storage space may not include security or climate control for stored material.
2. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.9 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of preconstruction photographs.

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

C. Owner's Removals: Before beginning alteration work, verify in correspondence with Owner that the following items have been removed:

1. Student artwork mounted to or near the Work as identified on the drawings.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
 - 3. Erect temporary barriers to form and maintain fire-egress routes.
 - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
 - 5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
 - 6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 - 7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
- B. Temporary Protection of Materials to Remain:
 - 1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 - 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.
- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- D. Utility and Communications Services:
 - 1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
 - 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
 - 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

3.2 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
 - 1. Comply with NFPA 241 requirements unless otherwise indicated.
 - 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

- a. If combustible material cannot be removed, provide fire blankets to cover such materials.
- B. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.
- C. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
 1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PREPARATION:

- A. Advise Owner and occupants of operations involving use of hazardous materials.
- B. Verify disposition of utilities and services in areas to be altered.
- C. Perform exploratory work for examination and determination of interdependent components.
- D. Determine extent of adjustments and temporary measures.
- E. Beginning of alteration work means acceptance of existing conditions.

3.4 GENERAL ALTERATION WORK

- A. The Contractor and all Subcontractors shall observe the following general procedures and requirements when performing alteration work:
 1. Have specialty work performed only by qualified specialists.
 2. Ensure that supervisory personnel are present when work begins and during its progress.
 3. Record existing work before each procedure (preconstruction).
 4. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
 5. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
 - a. Do not proceed with the work in question until directed by Architect.
 6. Cut, move, or remove items as necessary for access to alterations and renovation work. Replace and restore at completion.
 7. Remove unsuitable material not indicated as salvage, repair, or replace such materials as required for finished work.
 8. Remove debris and abandoned items from area and from concealed spaces.
 9. Extend existing to new lines of termination.
 10. Repair surfaces and components to provide for installation of new work and finishes, and to provide means of restoring existing to original condition.
 11. Install products in accordance with requirements of individual sections.

B. RELOCATION AND REUSE OF MATERIALS AND EQUIPMENT:

1. Carefully remove materials and equipment to be reused.
2. Perform work indicated and reinstall at location indicated.
3. Return temporarily removed items to original location upon completion of related work as indicated.
4. Reinstall relocated items at new location indicated.
5. Install salvage materials in accordance with "execution" requirements of similar new products

C. PATCHING AND MATCHING:

1. Patch surfaces and areas altered to produce uniform finish and texture over entire area. Use material and workmanship matching original construction.
2. Where new work abuts or aligns with existing, make smooth and even transition without noticeable change in plane or material. Patched work shall match existing adjacent work in texture and appearance.
3. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surfaced along a straight line at a natural line of division and provide trim appropriate to materials and approved by Architect.

D. ADJUSTMENTS FOR TRANSITIONS:

1. Where removal of elements results in adjacent spaces becoming one, rework surfaces to a smooth plane without breaks and steps. Where a change of plane $\frac{1}{4}$ " or more occurs submit recommendation for providing a smooth transition to the Architect for review.
2. Install permanent supplemental support and back up where openings are created.
3. Trim existing materials as necessary for clearance of new finishes and other obstructions, refinish trimmed edges.

E. REPAIR OF EXISTING

1. Patch or repair portions of existing surfaces which are damaged, discolored, or showing other imperfections.
2. Repair substrate prior to patching finish.
3. Refinish visible existing surfaces to remain in renovated rooms and spaces to specified condition for each material, with smooth and even transition to adjacent new finishes.
4. Clean, adjust and retrofit operational functions and systems.

F. FINISHING:

1. Prepare surfaces as recommended by manufacturers of finishes to be applied. Include necessary cleaning, preparation, and sealing of existing surfaces.
2. Finish surfaces in accordance with requirements of individual section.
3. When finish cannot be matched, refinish entire surface to nearest intersections (e.g. next corner).

3.5 PROTECTION OF EXISTING SYSTEMS DURING DEMOLITION AND RENOVATIONS**A. Prior to commencement of construction, at the request of the Contractor, the Owner will demonstrate for the contractor the operating capabilities of the following systems:**

1. Security System.

- B. During Construction, the Contractor will make every effort to protect the above listed systems, including but not limited to, providing temporary supports for devices located in ceilings to be removed, providing plastic bags for protection of devices from dust and debris, and repositioning of system wiring to avoid damage.
- C. When the new ceiling installation is sufficiently complete, reinstall all devices
- D. Obtain the Services of an Authorized Manufacturer Service Representative for returning and extending the Security System and Fire Alarm System to working condition.

END OF SECTION 013516

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control including the following:
 - 1. Testing, adjusting, and balancing provided by Owner.
 - 2. Structural steel inspection provided by Owner.
 - 3. Concrete testing/reinforcement inspection provided by Owner.
 - 4. Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
 - 5. Requirements for the Contractor to provide quality control services required by the Owner, Engineer, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

- E. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect[**or Construction Manager**].

1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Engineer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.
- B. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.
- C. Superintendent Resume: Submit documentation showing the name and contact information for the Contactor's Superintendent and that this designee meets the following minimum requirements:
 - 1. Minimum 5-years of experience as a Superintendent with direct, overall responsibility for managing contracts of similar size, type, and complexity to the Work in this Project within the last 7 years.
 - 2. A bachelor's degree, an associate's degree, or Journeyman status in a building trade.
 - 3. Certificate of Completion from a 10-hour OSHA Hazard Recognition Training Course and OSHA 30 hour safety training.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- F. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.
 - 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 - 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 8. Demolish and remove mockups when directed unless otherwise indicated.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.

- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 7. Submission of Superintendent's Progress Reports to the Owner and Architect at intervals agreed to at the beginning of the Project.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect, Owner, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, Owner, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary

services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SITE SUPERVISION

A. Superintendent: The Contractor shall utilize a full-time project superintendent in charge of all construction activities. This person shall meet the qualifications listed in these specifications and any other requirements of the Owner. The duties of the Superintendent include but are not limited to:

1. The Superintendent shall be the Contractor's full time on-site representative for the Work that serves as the Jobsite production manager to plan, organize, coordinate, supervise, and observe all Jobsite construction activities. This person shall be available, on site, at all times during construction.
2. The Superintendent controls all aspects of the Jobsite; enforces environmental, health and safety requirements; coordinates the Work in advance; monitors, controls and supervises all field personnel and activities; ensures compliance with the Construction Documents; controls, enforces and is responsible for the Quality of work produced; is responsible for timely performance of the Work; and documents the Jobsite activity each day.
3. The General Superintendent corrects all noted deficiencies and ensures Quality is established and preserved throughout the duration of the project until the acceptance of the Work by the Owner.
4. The Superintendent shall also be directly responsible for ensuring the work is performed in a safe and healthful manner. They shall be knowledgeable of the hazards attendant to the work, aware of the necessary hazard controls and authorized to effect prompt action to control or eliminate them.
5. All problems, questions, coordination, etc. relating to the Work shall take place through the Superintendent to the Contractor and Architect.
6. The Superintendent shall prepare progress reports at regular intervals (daily, weekly, etc.) as agreed to with the Owner at the start of the Project. Prepare reports throughout the duration of the Project to document all construction activities performed by the Contractor and/or their Subcontractors. Superintendent's progress reports shall be dated and signed by the Superintendent and shall contain the following information:
 - a. Date of report, report number, Project name and address, Contractor name and address.
 - b. Describe Work performed and include location, description, company name, worker quantity, and hours per trade and task.

- c. Identify job safety such as meetings, accidents, hazardous work completion, and safety inspections completion.
- d. Identify by submittal number equipment and/or material received, noting differences between quantities received and quantities required, or differences between materials received and approved materials. Describe location and method of storage of received equipment and/or materials.
- e. Identify production shortfalls and quality deficiencies and actions to correct them.
- f. Any additional remarks.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Owner's reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC - Associated Air Balance Council; www.aabc.com.
 - 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 - 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 - 7. ABMA - American Boiler Manufacturers Association; www.abma.com.
 - 8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
 - 9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 - 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 - 11. AF&PA - American Forest & Paper Association; www.afandpa.org.
 - 12. AGA - American Gas Association; www.aga.org.
 - 13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 - 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 - 15. AI - Asphalt Institute; www.asphaltinstitute.org.
 - 16. AIA - American Institute of Architects (The); www.aia.org.
 - 17. AISC - American Institute of Steel Construction; www.aisc.org.
 - 18. AISI - American Iron and Steel Institute; www.steel.org.
 - 19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 - 20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 - 21. ANSI - American National Standards Institute; www.ansi.org.
 - 22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 - 23. APA - APA - The Engineered Wood Association; www.apawood.org.
 - 24. APA - Architectural Precast Association; www.archprecast.org.
 - 25. API - American Petroleum Institute; www.api.org.
 - 26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
 - 27. ARI - American Refrigeration Institute; (See AHRI).
 - 28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
 - 29. ASCE - American Society of Civil Engineers; www.asce.org.
 - 30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
 - 31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
 - 32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.

33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWWA - American Water Works Association; www.awwa.org.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; <http://ec.europa.eu/growth/single-market/ce-marking/>
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - CSA Group; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsintstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.

84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; www.iccsafe.org.
103. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
106. IEC - International Electrotechnical Commission; www.iec.ch.
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
108. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
111. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
112. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
113. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
118. ISO - International Organization for Standardization; www.iso.org.
119. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; www.itu.int/home.
121. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA - Laminating Materials Association; (See CPA).
123. LPI - Lightning Protection Institute; www.lightning.org.
124. MBMA - Metal Building Manufacturers Association; www.mbma.com.
125. MCA - Metal Construction Association; www.metalconstruction.org.
126. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
127. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
128. MHIA - Material Handling Industry of America; www.mhia.org.
129. MIA - Marble Institute of America; www.marble-institute.com.
130. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
131. MPI - Master Painters Institute; www.paintinfo.com.
132. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.

133. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
134. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
135. NADCA - National Air Duct Cleaners Association; www.nadca.com.
136. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
137. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
138. NBI - New Buildings Institute; www.newbuildings.org.
139. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
140. NCMA - National Concrete Masonry Association; www.ncma.org.
141. NEBB - National Environmental Balancing Bureau; www.nebb.org.
142. NECA - National Electrical Contractors Association; www.necanet.org.
143. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
144. NEMA - National Electrical Manufacturers Association; www.nema.org.
145. NETA - InterNational Electrical Testing Association; www.netaworld.org.
146. NFHS - National Federation of State High School Associations; www.nfhs.org.
147. NFPA - National Fire Protection Association; www.nfpa.org.
148. NFPA - NFPA International; (See NFPA).
149. NFRC - National Fenestration Rating Council; www.nfrc.org.
150. NHLA - National Hardwood Lumber Association; www.nhla.com.
151. NLGA - National Lumber Grades Authority; www.nlga.org.
152. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
153. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
154. NRCA - National Roofing Contractors Association; www.nrca.net.
155. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
156. NSF - NSF International; www.nsf.org.
157. NSPE - National Society of Professional Engineers; www.nspe.org.
158. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
159. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
160. NWFA - National Wood Flooring Association; www.nwfa.org.
161. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
162. PDI - Plumbing & Drainage Institute; www.pdionline.org.
163. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); <http://www.plasa.org>.
164. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
165. RFCI - Resilient Floor Covering Institute; www.rfci.com.
166. RIS - Redwood Inspection Service; www.redwoodinspection.com.
167. SAE - SAE International; www.sae.org.
168. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
169. SDI - Steel Deck Institute; www.sdi.org.
170. SDI - Steel Door Institute; www.steeldoor.org.
171. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
172. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
173. SIA - Security Industry Association; www.siaonline.org.
174. SJI - Steel Joist Institute; www.steeljoist.org.
175. SMA - Screen Manufacturers Association; www.smainfo.org.
176. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
177. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
178. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
179. SPIB - Southern Pine Inspection Bureau; www.spib.org.
180. SPRI - Single Ply Roofing Industry; www.spri.org.
181. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
182. SSINA - Specialty Steel Industry of North America; www.ssina.com.
183. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
184. STI - Steel Tank Institute; www.steeltank.com.

185. SWI - Steel Window Institute; www.steelwindows.com.
186. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
187. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
188. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
189. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
190. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
191. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
192. TMS - The Masonry Society; www.masonrysociety.org.
193. TPI - Truss Plate Institute; www.tpinst.org.
194. TPI - Turfgrass Producers International; www.turfgrasssod.org.
195. TRI - Tile Roofing Institute; www.tilerroofing.org.
196. UL - Underwriters Laboratories Inc.; <http://www.ul.com>.
197. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
198. USAV - USA Volleyball; www.usavolleyball.org.
199. USGBC - U.S. Green Building Council; www.usgbc.org.
200. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
201. WA - Wallcoverings Association; www.wallcoverings.org.
202. WASTEC - Waste Equipment Technology Association; www.wastec.org.
203. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
204. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
205. WDMA - Window & Door Manufacturers Association; www.wdma.com.
206. WI - Woodwork Institute; www.wicnet.org.
207. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
208. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.

14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
 15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
 16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
 17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
 18. USP - U.S. Pharmacopeial Convention; www.usp.org.
 19. USPS - United States Postal Service; www.usps.com.
- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
 3. DSCC - Defense Supply Center Columbus; (See FS).
 4. FED-STD - Federal Standard; (See FS).
 5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
 6. MILSPEC - Military Specification and Standards; (See DOD).
 7. USAB - United States Access Board; www.access-board.gov.
 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 3. CDHS; California Department of Health Services; (See CDPH).
 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.
 8. COMAR; Code of Maryland; www.dsd.state.md.us/COMAR

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's testing agencies and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- B. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.

4. Waste-handling procedures.
5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- C. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: The Contractor will provide conditioned interior space for field offices for duration of Project.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 1. Store combustible materials apart from building.

2.3 EQUIPMENT

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

- B. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Contractor shall provide all necessary temporary sanitary facilities for construction personnel, such as toilets, water, etc. Use of Owner's facilities is prohibited.
- D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
 - 1. Connect temporary service to Owner's existing power source, as directed by Owner.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide owner with a list of all telephone numbers for Contractor and Subcontractors including main office and mobile telephone numbers for on site staff

3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.

2. Maintain and touch up signs so they are legible at all times.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- G. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Pest Control: Engage the Owner's maintenance and custodial departments to recommend and implement practices to minimize attraction and harboring of rodents, roaches, and other pests so Project will be free of pests and their residues at Substantial Completion.

- F. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 3. Insulate partitions to control noise transmission to occupied areas.
 - 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 5. Protect air-handling equipment.
 - 6. Provide walk-off mats at each entrance through temporary partition.
- H. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights. Contractor to provide code compliant temporary partitions, doors, and hardware to separate Work and pedestrian or vehicular traffic.
- I. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism. Contractor is responsible for their own security.
- J. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site. Contractor to conduct work in accordance with Technical Bulletin by MSDE titled Maintaining Acceptable Indoor Air Quality during The Renovation Of A School. Also all trades must comply with HCPSS Indoor Air Quality Specification.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
 - 5. Protect existing fire-suppression sprinkler systems from construction activities and to prevent accidental discharge.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard and replace stored or installed material that begins to grow mold.
 - 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 2. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that

does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 10 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Where products are accompanied by the term "as selected," Architect will make selection.
4. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
5. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
2. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience **[will]** will not be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."
3. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ..."
4. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
- B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 013300 "Submittal Procedures" for submitting surveys.
 - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 INFORMATIONAL SUBMITTALS

- A. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.

- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surface cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.

1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 INFORMATIONAL SUBMITTALS

- A. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- B. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review requirements for documenting quantities of each type of waste and its disposition.
 - 2. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 3. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 4. Review waste management requirements for each trade.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
 - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Prior Use and Occupancy
 - 2. Substantial Completion procedures.
 - 3. Final completion procedures.
 - 4. Warranties.
 - 5. Final cleaning.
 - 6. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificates of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 PRIOR USE AND OCCUPANCY

- A. The Owner reserves the right to use or occupy the building or any part thereof, or to use equipment installed under this contract prior to final acceptance of the Work or any part thereof.

1.7 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 5 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities.
 - a. The Owner will obtain the Use and Occupancy Permit from Howard County.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 5 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 - 6. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 - 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 8. Complete final cleaning requirements.
 - 9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 5 days prior to date the Work will be completed and ready for final inspection and

tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.8 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit consent of surety on AIA Document G707 "Consent of Surety Company to Final Payment".
5. Submit final liquidated damages settlement statement, acceptable to Owner.
6. Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.
7. Certify that to Contractor's knowledge no products containing harmful amounts of asbestos have been installed in any portion of the project.
8. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.9 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

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

1. Organize list of spaces in a logical, sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Submit list of incomplete items in the following format:
 - a. PDF electronic file. Architect will return annotated file.

1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit by email to Architect.
- D. Warranties in Paper Form:
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - o. Leave Project clean and ready for occupancy.

- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Emergency manuals.
 - 3. Systems and equipment operation manuals.
 - 4. Systems and equipment maintenance manuals.
 - 5. Product maintenance manuals.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit draft and manuals by email to Architect and Owner. Enable reviewer comments on draft submittals.
 - 2. Submit hard (paper) copies of the manuals to the Owner if requested.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's and Owner's comments. Submit copies of each corrected manual within 10 days of receipt of Architect's and Owner's comments and prior to commencing demonstration and training.
- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Manuals, Paper Copy: IF REQUESTED BY THE OWNER, submit manuals in the form of hard-copy, bound and labeled volumes.
 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in

manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Architect.
 - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

1.7 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.

2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.8 SYSTEM AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.

6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.
- I. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 1. Do not use original project record documents as part of maintenance manuals.

1.9 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
 1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 2. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Record data as soon as possible after obtaining it.
 - c. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit record Specifications as paper copy.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as paper copy.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

- B. Format: Submit miscellaneous record submittals as paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Owner's reference during normal working hours.

END OF SECTION 017839

SECTION 02070 -- SELECTIVE DEMOLITION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. Provide a copy of all applicable drawings, including shop drawings, and specifications at the site during all work covered under this Section.

1.2 RELATED DOCUMENTS

- A. The Drawings and General Conditions of the Contract for Construction and General Requirements are hereby made a part of this Section.
- B. Refer to other Divisions of these specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.3 SCOPE OF WORK

- A. Provide all labor, materials, equipment services, and accessories necessary to furnish and install work in this Section, complete and functional as indicated in the Contract Documents and as specified herein.
- B. Disposal of materials removed from the building in preparation for masonry or other trades, is performed under this section. The following paragraphs summarize the general extent of that work, itemized by trade.
- C. This Section includes the following:
 - 1. Pre-demolition Condition Survey
 - a. Prior to the start of demolition work, perform a detailed condition survey of all interior spaces that abut exterior walls. Document existing conditions with digital photographs and annotated hand sketches.
 - 2. Pre-demolition Utility Survey
 - a. Prior to the start of demolition work, retain the services of a utility-location contractor to identify and document the location and extent of all utilities within the exterior masonry walls within the areas of the work.
 - 3. Shoring and Bracing
 - a. Provide all labor, materials, equipment, and supervision necessary to design, provide, install, and maintain shoring necessary to safely support the existing roof structure in areas indicated during the Work and to accomplish the Work. Selective demolition will temporarily weaken the structure. The Contractor is responsible for designing and providing the shoring.

- b. The Contractor shall retain the services of a registered Professional Engineer licensed in the State of Maryland to prepare a design for shoring and a narrative describing the proposed sequencing of shoring, demolition, and construction. Section 1.05 Submittals, below for submittal requirements.

4. Masonry Removals

- a. Remove brick masonry, and associated components, at the locations and for the extents shown on the drawings. Support all masonry to prevent damage throughout the construction.
 - (1) Remove and dispose of brick masonry above beam, hung plates, or loose angle lintels as shown on the drawings.
 - (2) Remove and dispose of flashing cut out at lintels.
 - (3) Remove and dispose of existing cavity insulation where encountered.
 - (4) Remove and dispose of cracked or otherwise damaged brick masonry units where encountered.
- b. Carefully execute the selective removal as shown on Drawings. Remove identified components by saw cutting the perimeter of the portion to be removed in a manner to permit toothing-in upon restoration. Do not damage existing components scheduled to remain.

- D. Provide temporary protection to adjacent property from damage throughout the duration of the Project. The cost of repairs for any damage to adjacent property shall be borne by the contractor.

1.4 COORDINATION AND SEQUENCING WITH RELATED WORK

- A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to the work of this Section include the following:
 - 1. Section 076200 – Metal Flashing
 - 2. Section 079000 – Joint Sealants
 - 3. Section 081113 – Hollow Metal Doors and Frames
 - 4. Section 084113 – Aluminum Framed Entrances and Storefronts
- B. Work in cooperation with other trades by the timely performance of the demolition work, including temporary protection, as required. Coordinate with other trades to minimize disruption to the building occupants, maintain accessibility of building entrances, and prevent leakage to the interior.

1.5 SUBMITTALS

- A. Submit the following items in accordance with Section 01300 – Submittals.
- B. Contractor Qualifications: Contractor performing the work under this section must have a minimum of five years of experience in comparable work and must submit a list, with references, of three buildings on which they worked in the last five years, employing workers skilled in the restoration processes and operations indicated.

1. List building name and address, engineer, general contractor, and appropriate subcontractors with phone numbers and contact person.
 - C. Submit documentation of pre-demolition condition survey. Survey shall include plan drawings of the building interior that are affected by the work. Note existing damage to interior finishes and any unusual conditions. Document all interior spaces that about the work in general and any existing damage in particular, with digital photographs. Submit sample of survey documentation for approval before undertaking survey.
 - D. Shoring
 1. Provide Engineering calculations and narrative describing the proposed sequencing of shoring, demolition, and construction prepared by and bearing the seal and signature of a registered Professional Engineer in the State of Maryland.
 2. The submittals described herein are for information only and not for approval. Review by the Engineer is advisory in nature only and does not relieve the Contractor of his responsibility for designing and implementing a safe shoring system.
 - E. Provide a detailed description of the demolition process, equipment to be used, and any materials required to complete the work, for approval. Include procedures and detail drawings for protection of exterior building surfaces and landscaping, interior debris barricades, and exterior debris chute nets.
- 1.6 PROJECT CONDITIONS
- A. Comply with conditions listed in Section 011000 – Summary.
- 1.7 QUALITY ASSURANCE
- A. The work of this Section shall be performed by a contractor with at least five years of successful experience with demolition similar to this project and acceptable to the Owner. The Contractor's superintendent and foreman will have at least five years of experience successfully reconstructing masonry systems on existing buildings. All work shall be performed by trained and authorized personnel.
 - B. Conduct a quality control program that includes the following, in part:
 1. Inspect conditions and material to ensure conformity with the Contract requirements.
 2. Inspect work in progress to ensure that the work complies with established procedures, approved mockups and the Contract requirements.
 3. Inspect completed and any corrected work to ensure its compliance with the Contract requirements.
 - C. Attend a preconstruction conference with representatives of the Owner, the Contractor, the Engineer, the Demolition Foreman, and all other involved trades to discuss the work covered under this Section.
 - D. Attend weekly job meetings during the course of the work as required by the Owner or Engineer.

1.8 PROTECTION

- A. Protect the existing building and its contents, interior finishes, and all site work during all demolition, removal, and repair operations against all risks associated with this work. Replace damaged components at no charge to the Owner and to the satisfaction of the Engineer using mechanics skilled in the appropriate trade including all site work. The premises, including access drives and parking areas, shall be left in a neat, clean, and safe condition at the end of each day's work.
- B. Do not damage existing materials scheduled to remain. Provide adequate protection of the window glass to prevent breakage, scratches, staining, etching, and any other damage during work associated with this Section.
- C. Provide adequate protection of roofing surfaces throughout the work. Where work is performed above or near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the roofing system is observed, regardless of the source of the damage.
- D. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Provide adequate temporary protection at all times to prevent water intrusion and drafts. Do not leave backup walls exposed.

1.9 MATERIALS, HANDLING, AND STORAGE

- A. Dispose of debris daily in a dumpster. Dispose of all debris in a legal manner, off the site, as required by applicable law. Do not throw debris from scaffolding; conduct debris to trucks or approved containers on the ground to minimize dust, and remove from the site. Do not allow debris to accumulate on the construction site. Sprinkle debris with water to control dust during handling, but do not allow water inside the building.
- B. Do not stockpile materials or equipment to overload any building or site component.
- C. Remove all tools, buckets, and materials from work areas and store neatly at a central location daily at the end of work.

1.10 WARRANTY

- A. Guarantee all work under this section in a document stating that if, within two years after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. In addition, it shall state that the Contractor shall bear all costs incurred by the Owner, including reasonable attorney's fees, to enforce compliance with the obligations of this guarantee. The obligation of these Guarantees shall run directly to the Owner, may be enforced by the Owner against the Contractor, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

PART 2 – PRODUCTS

2.1 EQUIPMENT

- A. Demolition Equipment

1. Use concrete saw, chipping hammers, and other demolition equipment and cutting tools appropriate for the work and acceptable to the Engineer.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify all site conditions and dimensions by field measurements. Notify the Engineer immediately of any inconsistencies between field conditions and those shown in the Contract Drawings.

3.2 WORK AT OCCUPIED SPACES

- A. Notify the Owner 48 hrs minimum prior to commencing any demolition work in or around occupied spaces.
- B. Cover, protect, or move all items in occupied spaces where work is required per the Owner's request. Replace or repair all damaged items at no cost to the Owner.

3.3 GENERAL DEMOLITION

- A. Do not proceed with demolition of any portions of the building until shop drawings, and field measurements have been submitted and approved by the Engineer.
- B. Do not start demolition until the Engineer has approved the mockups.
- C. Take care not to damage any building components to be reinstalled at the completion of the work. Provide appropriate protection for materials to be stored and reinstalled.
- D. Complete demolition work in a manner to avoid causing damage to underlying substrates and materials. Repair all damaged substrates and materials at no cost to the Owner.

3.4 MASONRY REMOVAL

- A. Provide all necessary shoring or alternate support to all adjoining masonry scheduled to remain to prevent masonry from moving, cracking, or becoming damaged during the work.
- B. Completely remove concrete and brick masonry where shown on the drawings. Do not overcut into masonry scheduled to remain in place. Take care not to damage masonry during demolition.
- C. Sawcut all mortar joints between masonry scheduled to remain and masonry scheduled to be removed before attempting to remove any of the existing masonry. Provide for toothing of masonry between new and existing masonry scheduled to remain as required to maintain coursing. Do not break bond between mortar and masonry scheduled to remain, or crack masonry in areas to remain. Completely repair or rebuild remaining masonry work damaged by the demolition process, at no cost to the Owner.
- D. Remove all mortar from toothed areas (faces and ends) of existing masonry at junctions with new masonry to the extent possible without damaging masonry.

3.5 METAL AND MEMBRANE FLASHING REMOVAL

- A. Remove and dispose of existing metal and membrane flashing, including all underlying materials down to the structural and miscellaneous steel, where specified on the Drawings.
- B. Protect building from water infiltration during and after removal of flashing systems during all work.

END OF SECTION 020700

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes for concrete slabs on grade, and turn down slabs at building entrances.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.

2. Admixtures.
3. Steel reinforcement and accessories.
4. Any other accessories or materials to be used by the Installer including but not limited to:
 - a. Curing compounds.
 - b. Floor and slab treatments.
 - c. Bonding agents.
 - d. Adhesives.
 - e. Vapor retarders.
 - f. Joint-filler strips.
 - g. Repair materials.

1.6 QUALITY ASSURANCE

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

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

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

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.
- C. Deformed-Steel Wire: ASTM A 1064/A 1064M.
- D. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- E. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.
- C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- D. Zinc Repair Material: ASTM A 780/A 780M.
- E. 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," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - 3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I, normal Portland type.
 - 2. Fly Ash: Not permitted.
 - 3. Calcined Pozzolan: ASTM C 618, Class N.
 - 4. Silica Fume: ASTM C1240, amorphous silica
- C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3M coarse aggregate or better, graded, not exceeding 3/4inch. Provide aggregates from a single source.
- D. Air-Entraining Admixture: ASTM C 260/C 260M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that will not result in soluble chloride ions in excess of 0.1 percent by weight of cement. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- F. Water: ASTM C 94/C 94M.

2.5 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Maximum Permeance ASTM E96: 0.018 perms
 - 2. Provide standard accessories and tape for a complete system
 - 3. Products from the following manufactures shall be considered acceptable.
 - a. Stego Industries, LLC
 - b. W.R. Meadows, Inc.
 - c. Reef Industries
 - 4. Single-ply polyethylene is prohibited

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Provide Type required for specific application and, for bonding hardened or freshly mixed concrete to hardened concrete.
- C. Non-Shrink Grout: ASTM C 1107/C 1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing, and plasticizing agents.
 1. Minimum Compressive Strength at 48 hours: 2,400 psi
 2. Minimum Compressive Strength at 28 days: 7,000 psi

2.7 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.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Replace no less than 30% and no more than 40% of portland cement in concrete with approved pozzolanic materials as follows:
 1. Silica Fume Content: Not to exceed 5% of total cementitious material by weight.
 2. Calcined Pozzolan Content: Not to exceed 10% of cementitious material by weight.
 3. Slag Cement: Not to exceed 35% of cementitious material by weight.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.1 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions and as recommended in ACI 211.1

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Normal-weight concrete.
 1. Minimum Compressive Strength: 4500 psi at 28 days when tested in accordance with ASTM C 39/ C39M.
 2. Maximum W/C Ratio: 0.45.
 3. Slump Limit: 4 inches maximum
 4. Air Content: 3 percent, determined in accordance with ASTM C 173/C 173M

2.9 FABRICATING REINFORCEMENT

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

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, 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.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete and insert steel dowels using an epoxy adhesive approved by the Architect.

3.2 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.
- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

3.3 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.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. 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.
- D. 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.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. 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. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.6 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. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo and sidewalks.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten 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 surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:

3. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch.
- D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 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.

3.7 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.8 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 305.1 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. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. 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 with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 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 Compound: Apply uniformly in 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. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
4. 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.

3.9 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.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

- a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.11 Defective Concrete

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

1. Testing and inspecting agency will make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by Architect.
 2. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 4. Correct deficiencies that test reports and inspections indicate do not comply with specified requirements.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements. Repair or replace defective concrete, subject to the approval of the Architect.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Concrete building brick.
3. Clay face brick.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry-joint reinforcement.
7. Ties and anchors.
8. Embedded flashing.
9. Miscellaneous masonry accessories.
10. Cavity-wall insulation

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.
2. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.

3. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:

1. Concrete face brick, in the form of small-scale units.
2. Clay face brick, in the form of straps of five or more bricks.
3. Colored mortar.
4. Weep holes/cavity vents.

D. Samples for Verification: For each type and color of the following:

1. Clay face brick, in the form of straps of five or more bricks.
2. Special brick shapes.
3. Weep holes and cavity vents.
4. Accessories embedded in masonry.

1.5 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Material Certificates: For each type and size of the following:

1. Masonry units.
 - a. Include data on material properties material test reports substantiating compliance with requirements.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups. **(NOTE THAT NEW FACE BRICK, NEW MORTAR, AND NEW MASONRY WORK IS TO MATCH EXISTING SCHOOL MASONRY WORK.)**
 - 1. Build sample panels for typical exterior wall in sizes approximately 60 inches long by 60 inches high by full thickness.
 - a. Include all accessories, flashing, air barrier, through wall flashing, etc. including appropriate material transitions.
 - b. Show flashing detail to window receptor/sill.
 - 2. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
 - 3. Clean one-half of exposed faces of panels with masonry cleaner indicated.
 - 4. Protect approved sample panels from the elements with weather-resistant membrane.
 - 5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90.
 - 1. Density Classification: Normal weight.
 - 2. Size (Width): Nominal face dimensions of 16 inches long and 8 inches high with nominal thicknesses as indicated on the drawings, manufactured to dimensions 3/8 inch less than nominal dimensions.
 - 3. Exposed Faces: Provide units with faces of a fine texture and consistent color
- C. Concrete Building Brick: ASTM C 55.
 - 1. Density Classification: Normal weight.
 - 2. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

2.4 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
- B. Clay Face Brick: Facing brick complying with ASTM C 216. **Face brick must match existing face brick as closely as possible**
 - 1. Products: Subject to compliance with the requirements, provide the following:
 - a. Glen-Gery, Corporation
 - b. The Belden Brick Company
 - c. Cushwa Division of Redland Brick, Inc.
 - d. Lawrenceville Division of Redland Brick, Inc.
 - e. Taylor Clay Products, Inc.
 - 2. Grade: SW.
 - 3. Type: FBA.
 - 4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 - 5. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

6. Color and Texture: Match face brick of the existing school.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
 1. Products: Subject to compliance with requirements, provide one of the following: **(NOTE: COLORING IS REQUIRED TO MATCH EXISTING MORTAR)**
 - a. Capital Materials Corporation – Riverton Portland Cement Lime Custom Color
 - b. Lafarge North America, Inc. – Eaglebond Portland & Lime Custom Color
 - c. Lehigh Cement Company – Lehigh Custom Color Portland/Lime Cement
 - d. Essroc – Flamingo Brixment Portland and Lime Blend Custom Color
- D. Aggregate for Mortar: ASTM C 144.
 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C 404.
- F. Water: Potable.

2.6 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
- B. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.
 1. Interior Walls: Hot-dip galvanized carbon steel.
 2. Exterior Walls: Hot-dip galvanized carbon steel.
 3. Wire Size for Side Rods: 0.148-inch diameter.
 4. Wire Size for Cross Rods: 0.148-inch diameter.
 5. Wire Size for Veneer Ties: 0.148-inch diameter.
 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
 7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- C. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

D. Masonry-Joint Reinforcement for Multiwythe Masonry:

1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus two side rods at each wythe of masonry 4 inches wide or less.
2. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

2.7 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch- thick steel sheet, galvanized after fabrication.
- D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, stainless-steel wire.
- E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch- thick steel sheet, galvanized after fabrication.
 2. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch- thick steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete.
- F. Partition Top Anchors: 0.105-inch- thick metal plate with a 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with Section 076200 "Sheet Metal Flashing and Trim" and as follows:

B. Flexible Flashing: Use the following unless otherwise indicated:

1. Asphalt-Coated Copper Flashing: 7-oz./sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Advanced Building Products Inc.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.

C. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge or flexible flashing with a metal drip edge.
4. Where flashing is fully concealed, use metal flashing or flexible flashing.

D. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."

E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

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

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).

D. Weep/Cavity Vent Products: Use the following unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products, Inc. – Mortar Maze weep vent
 - 2) Dayton Superior Corporation, Dur-O-Wall Division – Cell Vents
 - 3) Hohmann & Barnard, Inc. – Quadro Vent

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Advanced Building Products, Inc. – Mortar Break
 - b. Dayton Superior Corporation, Dur-O-Wall Division – Polytite MortarStop
 - c. Mortar Net USA, Ltd. – Mortar Net
2. Configuration: Provide one of the following:
 - a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.
 - b. Strips, not less than 1-1/2 inches thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.

2.10 CAVITY-WALL INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 587, Type IV, closed-cell product extruded with an integral skin.
- B. R Value: Products shall have a minimum aged thermal resistance (R-Value) for 1-inch of thickness of 5.6 deg. F x h x sq.ft./Btu at 75 deg F after 5 years.

1. Products: Subject to compliance with requirements, products from the following manufacturers shall be among those considered acceptable:
 - a. The Dow Chemical Company
 - b. Owens Corning Foam Insulation, LLC

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. Prosoco, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime mortar unless otherwise indicated.
 - 3. For exterior masonry, use portland cement-lime mortar.
 - 4. For reinforced masonry, use portland cement-lime mortar.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type S.
 - 3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
 - 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
 - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 - 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.
 - 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
 - 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
 - 1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
 - b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.
 - c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.
 - 2. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
1. Install preformed control-joint gaskets designed to fit standard sash block.
- C. Form expansion joints in brick as follows:
1. Build flanges of factory-fabricated, expansion-joint units into masonry.

3.10 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier air barrier, lapping at least 4 inches.
 3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 4. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/cavity vent products to form weep holes.
 2. Space weep holes 24 inches o.c. unless otherwise indicated.
- D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.11 REINFORCED UNIT MASONRY INSTALLATION

- A. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- B. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches.

3.12 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

3.13 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.14 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 042000

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Vapor-permeable, fluid-applied air barriers.
- B. Related Requirements:
 - 1. Section 042000 "Unit Masonry"
 - 2. Section 076200 "Metal Flashing and Trim"
 - 3. Section 079200 "Joint Sealants"
 - 4. Section 081113 "Hollow Metal Doors and Frames"
 - 5. Section 084113 "Aluminum Framed Entrances and Storefronts"

1.3 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 REFERENCES

- A. The following standards are applicable to this section:
 - 1. ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.
 - 2. ASTM E 283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 3. E 1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls
 - 4. ASTM E 330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - 5. ASTM E 331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 - 6. ASTM E 96: Water Vapor Transmission of Materials.

7. CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.
8. AMMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.
9. ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.
10. ASTM D 5590: Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.
 1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.
 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 3. Include details of interfaces with other materials that form part of air barrier.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by Installer, who work on Project.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
- D. Field quality-control reports.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
- B. Sample panel: Build a sample panel at one infill area to set quality standards for materials and execution. Notify Architect after completion of sample panel for inspection by Architect, Owner, and Membrane Manufacturer's representative
 1. Build sample panel incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection of air barrier before external insulation and cladding are installed.
 - b. Include junction with foundation wall intersection.
 - c. If Architect determines sample panel does not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
 2. Approval of sample panel does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.
- C. Store air barrier membranes, adhesives and primers at temperatures of 40 degrees F and rising.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.
 1. Protect substrates from environmental conditions that affect air-barrier performance.
 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

2.3 AIR BARRIERS, VAPOR PERMEABLE

- A. Vapor-Permeable Air Barrier: Single component, water-based, elastomeric emulsion membrane with an installed dry film thickness according to manufacturer's written instructions, over smooth, void-free substrates.
 - 1. Manufacturers: Subject to requirements of these specifications, products from the following manufacturers will be considered acceptable:
 - a. Henry Company
 - b. W.R. Meadows, Inc.
 - c. Polyguard Products, Inc.
 - d. Sika U.S., Sika Corporation
 - 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.0002 cfm/sq. ft. of surface area at 75 Pa. pressure difference; ASTM E 2178.
 - b. Vapor Permeance: Minimum 21 perms; ASTM E 96/E 96M, Desiccant Method, Procedure B.
 - c. Ultimate Elongation: Minimum 925 percent; ASTM D 412, Die C.
 - d. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D 4541, or 1327 lbf/ft to dry concrete when tested according to ASTM C836
 - e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - f. UV Resistance: Can be exposed to sunlight for 90 days according to manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.
- C. Insulation Adhesive: Synthetic, rubber based adhesive used to adhere cavity insulation to air barrier membrane.

- D. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
 - 3. Verify that substrates are visibly dry and free of moisture.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
 - 5. Do not proceed with application of air barrier membrane when rain is expected within 24 hours.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge isolation joints expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

- A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. Coordinate the installation of air barrier with installation of base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
 - 3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 - 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
 - 1. Transition Strip: Roll firmly to enhance adhesion.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- H. Seal top of through-wall flashings to air barrier with an additional 6-inch- wide, transition strip.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

- A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.
- B. Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
1. Vapor-Permeable Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 35 mils, applied in one coat.

3.5 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 2. Air-barrier dry film thickness.
 3. Continuous structural support of air-barrier system has been provided.
 4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 5. Site conditions for application temperature and dryness of substrates have been maintained.
 6. Maximum exposure time of materials to UV deterioration has not been exceeded.
 7. Surfaces have been primed, if applicable.
 8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 9. Termination mastic has been applied on cut edges.
 10. Strips and transition strips have been firmly adhered to substrate.
 11. Compatible materials have been used.
 12. Transitions at changes in direction and structural support at gaps have been provided.
 13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 14. All penetrations have been sealed.
- D. Air barriers will be considered defective if they do not pass tests and inspections.
1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 2. Remove and replace deficient air-barrier components for retesting as specified above.
- E. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

- F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
 - 3. Cap and protect exposed back up walls against wet weather conditions during and after application of membrane. Protect air barrier Work against wet weather conditions for a minimum of 24 hours.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.
- C. Remove masking materials after installation.

END OF SECTION 072726

SECTION 076200 -- METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. The Contract Titled “Standard form of Agreement between the Owner and the Contractor – AIA Document A201-2007” is hereby made a part of this section.
- B. Provide a copy of all applicable drawings, including shop drawings, and specifications at the site during all work covered under this Section.

1.2 RELATED DOCUMENTS

- A. The Drawings and General Conditions of the Contract for Construction and General Requirements are hereby made a part of this Section.
- B. Refer to other Divisions of these specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.3 SCOPE OF WORK

- A. Provide all labor, materials, equipment services, and accessories necessary to furnish and install work of this Section, complete and functional as indicated in the Contract Documents and as specified herein.
- B. This Section includes the following:
 - 1. Provide metal base flashing with hemmed drip edge. Provide expansion joints in metal flashings as specified below.
 - 2. Provide fabric metal counterflashing with termination bar at head in wall cavity lapped over metal base flashing. Provide end dams in fabric metal flashings one masonry head joint beyond loose lintel assemblies.
 - 3. Provide sloped grout beds beneath and behind metal through-wall flashings to support membrane flashing where shown on the drawings.
 - 4. Prepare substrates to receive and provide termination bar as specified in this section and as shown on the drawings.

1.4 COORDINATION AND SEQUENCING WITH RELATED WORK

- A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - 1. Section 020700 – Selective Demolition
 - 2. Section 042000 – Unit Masonry
 - 3. Section 040120 – Masonry Repairs
 - 4. Section 055000 – Miscellaneous Metals
 - 5. Section 072726 – Fluid-Applied Membrane Air Barrier

6. Section 079000 – Joint Sealants

- B. Work in cooperation with other trades by the timely performance of the metal flashing work, including temporary protection, as required. Coordinate with other trades to help ensure proper sequencing of assemblies, minimize disruption to the building occupants, maintain accessibility of building entrances, and prevent leakage to the interior.

1.5 STANDARDS

- A. Unless otherwise noted, comply with the latest edition of Revere's "Copper and Common Sense" Standards for Details.

1.6 PERFORMANCE REQUIREMENTS

- A. Furnish and install sheet metal flashing following the guidelines included herein, to provide a complete flashing system capable of withstanding service loads (e.g., wind, snow, etc.) while maintaining the following long-term performance requirements:
1. Sufficiently watertight to prevent building leakage.
 2. Secure attachment to the structure, without noticeable deformation.
 3. Free of corrosion, either from atmospheric conditions, galvanic action, or reaction with surrounding materials.
 4. Free of excessive scratching, staining, or other aesthetic issues. "Oil-canning" of sheet metal surfaces is not permitted.
- B. Flashing installations shall not be reliant on sealants or gaskets for primary waterproofing performance. No exposed sealant products are permitted except where shown on the Drawings.

1.7 SUBMITTALS

- A. Submit the following items in accordance with Section 013300 – Submittals.
- B. Contractor Qualifications
1. Contractor performing the work under this section must have a minimum of five years of experience in comparable work and must submit a list, with references, of three buildings on which they worked in the last five years, employing workers skilled in the restoration processes and operations indicated.
 2. List building name and address, engineer, general contractor, and appropriate subcontractors with phone numbers and contact person.
- C. Product Data: For each item, submit information on the component materials, including the following:
1. Manufacturer's literature for all materials specified or proposed for use on the project, properly labeled and referenced to the appropriate Specification Section.
 2. Material Safety Data Sheet (MSDS) for each material where appropriate.

3. Certifications by the producers of the materials that all materials supplied comply with all the requirements of the appropriate referenced standards, that all materials are compatible with adjacent materials, and that all materials are suitable for their intended purpose, except where material is labeled with such certification by the producers of the materials.
- D. Shop Drawings: Provide complete drawings for each assembly and fabrication required for the project. Show all metal work including exact profile, lengths, joints, terminations, and methods of attachment, including isometric corner and intersection details and exploded views of all complex intersections. Coordinate shop drawings with all relevant work of other trades specified in other specification sections.
- E. Samples: Submit samples of each material and typical flashing profiles specified or proposed for use on this project, properly labeled and referenced to the appropriate Specification Section.

1.8 PROJECT CONDITIONS

- A. Comply with conditions listed in Division 1 – General Requirements
- B. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.
- C. Compliance with OSHA and other safety laws and regulations is the exclusive responsibility of the contractor, his subcontractor(s), suppliers, consultants, and servants.

1.9 QUALITY ASSURANCE

- A. The work of this Section shall be performed by a contractor with at least five years of successful experience with metal flashing installation similar to this project and acceptable to the Owner. The Contractor's superintendent and foreman will have at least five years of experience successfully reconstructing masonry systems on existing buildings. All work shall be performed by trained and authorized personnel.
- B. Conduct a quality control program that includes the following, in part:
 1. Inspect conditions and material to ensure conformity with the Contract requirements.
 2. Inspect work in progress to ensure that the work complies with established procedures, approved mockups and the Contract requirements.
 3. Inspect completed and any corrected work to ensure its compliance with the Contract requirements.
- C. Attend regular job meetings during the course of the work as required by the Owner or Engineer.

1.10 PROTECTION

- A. Protect the existing building and its contents, interior finishes, and all site work during all demolition, removal, and repair operations against all risks associated with this work.

Replace damaged components at no charge to the Owner and to the satisfaction of the Engineer using mechanics skilled in the appropriate trade including all site work. The premises shall be left in a neat, clean, and safe condition at the end of each day's work.

- B. Do not damage existing materials scheduled to remain. Provide adequate protection of the window glass to prevent breakage, scratches, staining, etching, and any other damage during work associated with this Section. Do not allow mortar droppings or cleaning chemicals to remain on glass or aluminum surfaces.
- C. Provide adequate protection of roofing surfaces throughout the work. Where work is performed near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the roofing system is observed, regardless of the source of the damage.
- D. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Provide adequate temporary protection at all times to prevent water intrusion and drafts. Do not leave backup walls exposed.

1.11 MATERIALS, HANDLING, AND STORAGE

- A. Deliver materials clearly marked with legible and intact labels with manufacturer's name and brand name, and identifying contents of containers.
- B. Protect all materials in original, unopened, labeled containers and packaging and in compliance with manufacturer's directions. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage.
- C. Handle all materials to prevent damage.
- D. Keep all materials dry while they are transported, stored, and delivered. Deliver materials in manufacturer's unbroken containers. Store all materials on pallets and cover with fireproof canvas tarpaulins completely, top to bottom. Polyethylene covers are not acceptable. Store materials in a secure area designated by the Owner, with adequate tie-downs against wind gusts.
- E. Store elastomeric materials, adhesives, solvents and sealants in their original containers, and between 60°F and 80°F. If exposed to lower temperatures, restore to a uniform temperature of no less than 60°F prior to use.
- F. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool dry, protected area away from sparks and open flames.
- G. Do not stockpile materials or equipment to overload any building or site component.
- H. Remove all tools, buckets, and materials from work areas and store neatly at a central location daily at the end of work.

1.12 MOCKUPS

- A. Construct mockup samples of the through-wall metal flashing in conjunction with the face brick masonry mockups to determine the general workmanship. The mockup is to be constructed toward the start of construction.

- B. Notify the Architect at least 48 hrs before construction of the mockups, so that a representative may be present during construction.
- C. Do not start the metal flashing installation until the Architect has approved the mockups. Rebuild mockups as many times as required to meet the Architect's approval. Reproduce it accurately in construction using identical materials, mixtures, and quality of workmanship. Sample panels will be used to measure standards of workmanship, finish, texture, and color and may become a part of the completed work. Sample panels also will be used as a standard for completed work.
- D. In general, field mockups may become a permanent part of the work, after approval. The Contractor is responsible for reconstructing any mockups that are not approved along with any associated construction.
- E. Mechanics that perform soldering and other metal work for the project must demonstrate their skills in the mockup phase.

1.13 WARRANTY

- A. Guarantee all work under this section in a document stating that if, within two years after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. In addition, it shall state that the Contractor shall bear all costs incurred by the Owner, including reasonable attorney's fees, to enforce compliance with the obligations of this guarantee. The obligation of these Guarantees shall run directly to the Owner, may be enforced by the Owner against the Contractor, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Metal Flashing: 18-8 stainless steel AISI Type 304, 2D finish, 24 ga with 22 ga cleats, receivers, and hook strips.
 - 1. Rivets for Flashing Connections: Solid stainless steel, 3/16 in. dia. flat head rivets, of proper length for the material being fastened.
 - 2. Fasteners: Use stainless steel screws, bolts, washers, and nails as required. Nails to be 12 ga with minimum 1/4 in. dia. flat head, annular threaded, with needlepoint, and of sufficient length to obtain 1-1/4 in. embedment into blocking and for full depth into plywood. Use 1/4 in. by 1-1/2 in. nylon expansion sleeves with stainless steel drive pins for fastening to concrete, stone or masonry.
- B. Release tape: 0.060 in. thick polyethylene, adhesive-backed on one side, width as required.
- C. Strip flashing for metal expansion joints: 0.060 in. thick uncured EPDM, RubberGuard "Formflash," by Firestone Building Products Co., or approved equal; use manufacturer's recommended primers, adhesives, lap sealants, and solvent cleaners.
- D. Fabric Metal Flashing: Soft-tempered copper bonded on both sides with asphalt saturated glass fabric scrim and an elastic asphalt compound, conforming to ASTM B370. Provide

- flashing with 7oz weight in widths necessary for the project, and provide preformed end dams.. C-Fab Flashing by Hohmann & Barnard, Inc., or approved equal. Provide manufacturer's recommended solvent-based primers, mastics, and follow all surface preparation methods and requirements and installation instructions.
- E. Termination Bar: 14 ga, 1 in. wide, preformed, prepunched holes at 6 in. o.c., stainless steel bar for securing top edge of flashing. T1 or T2 Termination Bar by Hohmann & Barnard or approved equal.
 - 1. Fasteners: Hilti Kwik-con II or approved equal, 1/4 in. dia. stainless steel screw for concrete and concrete masonry, length to provide 1-1/4 in. minimum embedment.
 - F. Sloped Grout Bed: Thorite by Thoroproducts or approved equal.
 - G. Grout for Cavity Behind Metal Through-Wall Flashing: See Section 04200 Masonry Repairs.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify all site conditions and dimensions by field measurements in consideration of the special conditions associated with alteration of existing construction and reconstruction prior to development of Shop Drawings or submittals and to material fabrication or delivery. Notify the Engineer immediately of any inconsistencies between field conditions and those shown in the Contract Drawings.
- B. Examine all surfaces to receive flashing for roughness, contaminants, unsound structural substrates, or other conditions that may impair the membrane or metal application. Notify the Owner in writing of any such conditions; do not commence work until all defects are remedied.

3.2 GENERAL METAL FLASHING WORKMANSHIP

- A. Provide 1/8 in. / ft minimum slope on all horizontal surfaces to prevent ponding, unless otherwise indicated.
- B. Do not apply any new materials until the exposed surface of the substrate is clean, smooth and dry. Do not work in rain, snow, winds gusting over 30 mph, temperatures below 40°F, or in any presence of water. Comply with applicable recommendations by manufacturers of all materials for workmanship and handling, except as modified in this Section.
- C. Avoid exposure of any components to rain, snow, or dew. Promptly remove from the site all materials or incomplete flashing work exposed to any moisture, anywhere, at any time, during transportation, storage, handling and installation.
- D. Form sheet metal on a bending break. Perform shaping, trimming, and hand seaming in the shop as far as practicable, with the proper sheet-metal working tools. Make the angle of the bends and the folds for interlocking the metal with full regard for expansion and contraction, to avoid buckling or other deformation in service. All lines shall be straight and crisp except where thickness of metal dictates radius bend, and all exposed edges shall be hemmed 1/2 in. minimum
- E. Immediately prior to sealing, clean all surfaces to be sealed per manufacturer's instructions. position. Wipe sealed joints to remove all traces all excess material after joints are made.

- F. Exposed fasteners are prohibited.
- G. Do not penetrate the horizontal portion of any flashing with fasteners.
- H. Layout metal flashing to minimize transverse joints. Detail transverse joints in all flashing pieces to provide a watertight connection, and allow for expansion/contraction of the metal as shown on the Drawings. Provide pre-fabricated corner pieces with joints locked, riveted, and soldered watertight. Space rivets at 1 in. o.c. in staggered pattern unless otherwise indicated.
- I. Unless shown otherwise on the Drawings, provide expansion joints at 20 ft o.c. maximum and 2 ft away from all changes in flashing direction (each side) and from all terminations of flashing. Space expansion joints in metal through-wall flashing appropriately to ensure there are no expansion joints directly in front of windows.
- J. Form typical lapped flashing joints by overlapping 4 in. and soldering, except at expansion joints as specified above.

3.3 METAL FLASHING EXPANSION JOINT INSTALLATION

- A. Lap all metal through-wall flashing at least 6 in. at transverse expansion joints, and apply strip flashing and metal cover plate as shown on the details. Apply release tape, centered over exposed edge of joint and adhere strip flashing over joint.
- B. Cut and position strip flashing sheets in place. Inspect sheet for any discontinuities or deficiencies; do not use defective sheets. Do not use sheets with more than six "pinholes" in one of the two plies per square foot of sheet.
- C. Apply release tape over all joints and edges of the flashing covered by adhered neoprene sheet, and where shown on the Drawings.
- D. Clean all metal surfaces to receive strip flashing with clean, lint-free rags. Wet one rag with solvent and wipe surface. Use second rag to clean surface before solvent evaporates. Pump solvent from cans onto first rag. Do not dip rag into solvent, to avoid contamination of solvent. Allow to dry.
- E. Prime all substrates to which strip flashing is to be adhered with appropriate primer, and allow primer to dry. Recoat primed areas not covered by strip flashing within 12 hrs.
- F. Rush apply a full continuous coat of adhesive without holidays to the substrate and the sheet, using circular motion; roller application is not allowed. Allow adhesives to dry until tacky. Do not exceed maximum "open time" recommended by the manufacturer, or 12 hrs. Do not use, and remove from the site, all strip flashing that has been coated with adhesive and allowed to exceed the maximum "open time" or exposed for more than 12 hrs, or that has been exposed to any moisture before being applied to the substrate, or which has partially or fully cured. Do not expose adhesive coated substrate to moisture or air for more than 12 hrs. Protect adhesive from air-borne dust and debris while drying.
- G. Once the adhesive is dry, lay sheets into it promptly. Do not move or reposition sheets once they have contacted the adhesive. Immediately roll entire sheet into firm contact with the substrate using a smooth metal roller. Form sheets tightly into bends in flashing without stretching or cutting sheet.
- H. After 1 hr, seal continuously all edges of strip flashing with lap sealant and tool out over edges. Apply release tape over lap sealant and install metal cover plate.

- I. Provide 1/8 in. / ft minimum slope on all horizontal surfaces to prevent ponding, unless otherwise indicated.

3.4 INSTALLATION OF METAL BASE FLASHING

- A. Provide metal flashing systems as shown on the approved Shop Drawings. Coordinate metal flashing details with other trades. Where metal flashing terminates or is discontinuous, pan up ends of flashing, and solder corners watertight.
- B. Brake metal as shown. Provide a solid bed of sealant in joints, behind and within receiver metal.
- C. Provide fabric metal flashing at back edge of horizontal leg of through-wall flashing against back-up wall. Extend the horizontal leg of the flashing to the plane of the exterior face of the concrete masonry, turn down at 60°, and form a 1/2 in. fold at the bottom edge of the metal flashing. Do not extend the flashing hem more than 1/4 in. beyond the outboard face of the masonry.
- D. Field measure all window locations to receive metal window flashing. Cut sheet metal to custom fit individual window openings.
- E. Install head flashing as shown on the Drawings.
- F. Provide sloped grout bed beneath and behind metal flashings at locations and as shown on the drawings to support self-adhered membrane flashings. Slope horizontal grout surfaces toward the exterior of the building.

3.5 FABRIC METAL FLASHING INSTALLATION

- A. Do not apply the permanent new flashing material unless the exposed surface of the substrate is clean and dry.
- B. Provide fabric metal flashing as shown on the Drawings and in compliance with the printed instructions of the manufacturer, unless modified by this Section.
- C. Provide fabric metal flashing at the back edge of the horizontal leg of all through-wall flashings.
- D. Prepare all substrates to receive fabric metal flashing as recommended by the manufacturer.
- E. Begin application of sheets at bottom of the wall and work up the wall; shingle all side laps 3-1/2 in. minimum to shed water and provide 6 in. minimum end laps staggered 18 in. minimum. Apply sheets in longest lengths practical; shingle side laps so that they do not "buck" water.
- F. Seal all exposed perimeter edges at temporary tie-ins with specified mastic each day, and remove mastic before applying additional membrane flashing materials.
- G. Provide preformed end dams, minimum 1 brick course high, lapped and sealed to field flashing at both ends of lintel.
- H. Provide termination bar, fastened to existing substrate at 6 in. o.c. along the top edge of the flashing. Seal the top edge of fabric metal flashings and termination bar fasteners with mastic and tool to cover edges of penetrations.

- I. Seal ends of vertical seams and edges of flashing with a bead of compatible mastic and tool flat.
- J. Do not leave the completed membrane flashing exposed to the elements for more than two weeks. Remove and replace flashing that has been exposed for longer than this period.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. The following exterior joints:
 - a. The sealing of frames to masonry joints at exterior door frames, window frames, and louvers
 - 2. The following interior joints:
 - a. Joints around perimeters of frames
 - b. Joints in hollow metal door frames including sidelights and transoms, at the head-to-jamb mitered joint, at joints between glazing beads at corners, between glazing bead and frame after opening is glazed.
 - c. Setting bed for thresholds and sill plates

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- B. Field-Adhesion-Test Reports: For each sealant application tested.
- C. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each kind of sealant and joint substrate.
 - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193.
 - 4. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 - 5. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Low-Emitting Interior Sealants: Sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health's (formerly, the California Department of Health Services) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 1. The following products, provided they comply with the requirements of these documents, shall be among those considered acceptable:
 - a. Dow Corning Corporation; 791
 - b. GE Construction Sealants; SCS 2000 SilPruf
 - c. Pecora Corporation; PCS

2.3 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

1. The following products, provided they comply with the requirements of these documents, shall be among those considered acceptable:
 - a. Bostik, Inc.; Chem-Calk 300
 - b. Pecora Corporation; BC-158

2.4 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 1. The following products, provided they comply with the requirements of these documents, shall be among those considered acceptable:
 - a. BASF Construction Chemicals, LLC; Sonolac.
 - b. Pecora Corporation; AC-20
 - c. Tremco Incorporated; Tremflex 834

2.5 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform one test at each door or window opening for each kind of sealant and joint substrate.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between metal panels.
 - d. Joints between different materials listed above.
 - e. Exterior perimeter joints between materials listed above and frames of doors windows and louvers.
 - f. Control and expansion joints in overhead surfaces.
 - g. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of doors and windows.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: Paintable.
- C. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Interior hollow-metal doors and frames.
 - 2. Exterior hollow-metal doors and frames.
 - 3. Door and frame accessories: Anchors, clips, etc.
- B. Related Requirements:
 - 1. Section 042000 "Unit Masonry" for anchoring and grouting frames in masonry construction.
 - 2. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
 - 3. Section 099100 "Painting" for finishing hollow-metal doors and frames.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.

2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of each different wall opening condition.
 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 7. Details of anchorages, joints, field splices, and connections.
 8. Details of accessories.
 9. Details of moldings, removable stops, and glazing.
- C. Samples for Initial Selection: For hollow-metal doors and frames with factory-applied color finishes.
- D. Samples for Verification:
1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
- E. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
1. Amweld International, LLC.
 2. Curries Company; an Assa Abloy Group company
 3. Pioneer Industries, Inc.
 4. Republic Doors and Frames

5. Steelcraft; an Allegion company

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. Thermally Rated Door Assemblies: Provide door assemblies with the following thermal performance:
 1. Provide opaque door assemblies with a U-factor of not more than 0.61 deg Btu/F x h x sq. ft. when tested according to ASTM C 518.
 2. Provide entrance door assemblies (assemblies that contain glazing) with a U-factor of not more than 0.77 deg Btu/F x h x sq. ft. when tested according to ASTM C 518.

2.3 EXTERIOR STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A. Provide at all exterior locations and both inner and outer doors and frames in vestibules.
 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.059 inch (16 ga.), with minimum A40coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Polyurethane.
 - i. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated doors.
 2. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.074 inch (14 ga.), with minimum A40 coating.
 - b. Construction: Full profile welded.

3. Exposed Finish: Prime.

2.4 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch.
- B. Construction: Face welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.5 INSULATED METAL PANELS

- A. Provide insulated metal panels in locations in hollow metal frames indicated as **"IMP-2"** with following properties:
 1. Provide insulated hollow metal panels of the same face and core materials, construction, and finish as adjacent door assemblies.
 2. Install insulated hollow metal panels recessed in exterior rabbet of frame, tight to the stop using manufacturer's standard method. Provide a continuous bead of paintable sealant around panel perimeter after panel installation and prior final painting on panel and adjacent frame

2.6 FRAME ANCHORS

- A. Jamb Anchors:
 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated, but at a minimum:
 - a. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - b. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 - c. Post-installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
 - d. Quantity: Minimum of three anchors per jamb, refer to paragraph 2.7 of this section for additional requirements.
 - e. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

1. Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
 2. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
- C. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.7 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C143/C143M
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Section 088000 "Glazing."

2.8 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Doors:
1. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
 2. Vertical Edges for Single-Acting Doors: Provide beveled or square edges at manufacturer's discretion.
 3. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
 4. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.

5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 6. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - c. Compression Type: Not less than two anchors in each frame.
 - d. Post-installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted. Form from same material as frames, not less than 0.016 inches thick.
 5. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

- E. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
 - 1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 - 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 - 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.9 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with SDI A250.3.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.10 LOUVERS

- A. Provide louvers for doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch- thick, cold-rolled steel sheet set into 0.032-inch- thick steel frame.
 - 1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install interior frames with removable stops located on secure side of opening.
 - c. Install door silencers in frames before grouting.
 - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - f. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 - 2. Fire-Rated Openings: Install frames according to NFPA 80.
 - 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8 or NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
 - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.
- F. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Storefront framing.
 - 2. Manual-swing entrance doors.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware"
 - 2. Section 088000 "Glazing"

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 4. Include point-to-point wiring diagrams showing the following:
 - a. Power requirements for each electrically operated door hardware.
 - b. Location and types of switches, signal device, conduit sizes, and number and size of wires.

- C. Samples for Initial Selection: For units with factory-applied color finishes on aluminum substrate, not a printed color chart.
- D. Delegated-Design Submittal: Complete and submit design calculations for storefront systems signed and sealed by a professional structural engineer registered in the State of Maryland. Certified design calculations may be submitted with, or separate of shop drawings but must be reviewed prior to ordering materials. Final field-use drawings shall incorporate all fastener requirements (size, type, spacing, etc.) required by the design calculations.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Structural failures, including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design aluminum-framed entrances and storefronts. Completed calculations shall be signed and sealed by a professional structural engineer registered in the State of Maryland.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:

1. Wind Loads: As determined by the professional engineer according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.
- D. Structural: Test according to ASTM E 330/E 330M as follows:
1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..
 2. Entrance Doors:
 - a. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
- F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft..
- G. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.38 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas as a system shall have SHGC of no greater than 0.35 as determined according to NFRC 200.
 3. Condensation Resistance: Fixed glazing and framing areas as a system shall have an NFRC-certified condensation resistance rating of no less than 65 as determined according to AAMA 1503.
- H. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.
1. Outdoor-Indoor Transmission Class: Minimum 30.
- I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 STOREFRONT SYSTEMS

- A. Basis of Design: Subject to compliance of these specifications, provide Trifab 451 UT framing system as manufactured by the Kawneer Company. Equivalent products manufactured by one of the following will be considered acceptable:
1. YKK AP America, Inc.
 2. Tubelite, Inc.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Center.
 4. Finish: High-performance organic finish.
 5. Fabrication Method: Field-fabricated stick system.
 6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 7. Steel Reinforcement: As required by manufacturer.
 8. **Provide heavy-wall jamb members where indicated on the drawings to frame door openings.**
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Insulated Metal Panels: Provide laminated, metal-faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length in locations in aluminum framed entrance and in aluminum doors indicated as **"IMP-1"**.
1. Basis of Design: Mapes R as manufactured by Mapes Architectural Panels.
 2. Overall Panel Thickness: 1 inch.
 3. Exterior Skin: Aluminum.
 - a. Thickness: Manufacturer's standard for finish and texture indicated.
 - b. Finish: Match framing system.
 - c. Texture: Smooth.
 - d. Backing Sheet: 0.157-inch- thick cement board.
 4. Interior Skin: Aluminum.
 - a. Thickness: Manufacturer's standard for finish and texture indicated.
 - b. Finish: Matching storefront framing.
 - c. Texture: Smooth.
 - d. Backing Sheet: 0.157-inch- thick cement board.
 5. Thermal Insulation Core: Manufacturer's standard rigid, closed-cell, polyisocyanurate board.
 6. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- a. Flame-Spread Index: 25 or less.
- b. Smoke-Developed Index: 50 or less.

2.4 ENTRANCE DOOR SYSTEMS

- A. Basis of Design: Subject to compliance of these specifications, provide 500 Heavy Wall entrances as manufactured by the Kawneer Company. Equivalent products manufactured by one of the following will be considered acceptable.
 - 1. YKK AP America, Inc.
 - 2. Tubelite, Inc.
- B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
 - 1. Door Construction: 2-inch overall thickness, with minimum 0.188-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - 2. Door Design: Wide stile; 5-inch nominal width.
 - 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.7 MATERIALS

- A. Sheet and Plate: ASTM B 209.
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- D. Structural Profiles: ASTM B 308/B 308M.
- E. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.
- E. Rigid PVC Filler.

2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Physical and thermal isolation of glazing from framing members.
 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 5. Provisions for field replacement of glazing from exterior.
 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Multi-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.11 SOURCE QUALITY CONTROL

- A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations, including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

H. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.

- b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of two tests at each school as directed by Architect.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 MAINTENANCE SERVICE

- A. Entrance Door Hardware:
 - 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
 - 2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

END OF SECTION 084113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Mechanical door hardware for swinging doors.
2. Cylinders for door hardware and accessories.
3. Electrified door hardware.
4. Fire egress and security products.
5. Other items of hardware and miscellaneous accessories to complete the installation in accordance with applicable codes shall be provided whether indicated in hardware schedule or not.

- B. Related Requirements:

1. Section 081113 "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.

1.3 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1. Conference participants shall include Installer's Architectural Hardware Consultant, Contractor, Contractor's Locksmith, and Owner's representative familiar with door hardware.

B. Keying Conference: Conduct conference at Project site.

1. Conference participants shall include Installer's Architectural Hardware Consultant, Contractor, Contractor's Locksmith, and Owner's representative familiar with keying requirements.
2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - a. Flow of traffic and degree of security required.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule after or concurrent with submissions of Product Data. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - e. Fastenings and other installation information.
 - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - g. Mounting locations for door hardware.
 - h. List of related door devices specified in other Sections for each door and frame.

C. Keying Schedule: Separate detailed schedule indicating clearly how each lock is keyed. Coordinate with existing Howard County Public School System master keying system. Provide

cylinders and 7 pin cores as identified within this section and key into HCPSS Grand Master Key System and into existing keying system of each school.

1. The Contractor shall hire a bonded and insured Locksmith meeting the quality requirements listed in Division 1 of the specifications.
2. The Owner shall provide temporary construction (green) cores for all new doors.
3. The Contractor shall install temporary construction (green) cores in all new doors.
4. The Contractor shall provide permanent cores to the Locksmith for installation.
5. The Contractor's Locksmith shall remove and turn over to the Owner the temporary cores, and install the permanent cores.

- D. Samples: At time of submission of hardware schedules and before any material is ordered, the hardware supplier shall submit to the Architect for his approval a complete line of samples. Samples shall be plainly marked giving hardware types and sizes. The Architect will deliver approved samples to the project site to be stored. Samples will remain with the Architect until delivery of all hardware to the project is complete, after which time they will be turned over to the Contractor for incorporation into the work.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of electrified door hardware.
1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
1. Warehousing Facilities: In Project's vicinity.
 2. Scheduling Responsibility: Preparation of door hardware and keying schedule.

3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC) or an Architectural Openings Consultant (AOC).
- C. Fire Door Hardware: Tested for compliance with NFPA 80 and local building code requirements.
 1. Listing in current classification publications of the following agencies will be considered evidence of acceptable testing:
 - a. Underwriters Laboratories, Inc. (UL)
 - b. Warnock Hersey International, Inc. (WHI).
 2. Provide permanent labels on all hardware indicating the listing agency and conditions of the listing.

1.9 PROJECT CONDITIONS

- A. Sequence submittal of hardware schedule and door and frame submittals allowing adequate time for review and resubmittal, if required, so that construction is not delayed; provide adequate information for review.
- B. Furnish hardware templates to each fabricator of other work which is to be factory-prepared for the installation of hardware.
- C. Coordinate shop drawings of such other work to confirm that adequate provisions are made for installation.
- D. Provide a complete set of adjustment and maintenance tools.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to Owner by registered mail or overnight package service.

1.11 ALUMINUM ENTRANCE DOOR HARDWARE

- A. A single Contractor shall purchase all hardware for the project, including hardware that is specified for aluminum entrances.

- B. The hardware and aluminum storefront Contractors shall coordinate to provide templates or hardware to the aluminum storefront factory so that entrances are factory-prepared for the specified hardware. Field-preparation is not acceptable.
- C. The aluminum storefront Contractor is responsible for the installation, coordination with other trades, adjustment, and final acceptance of aluminum entrance door hardware.

1.12 WARRANTY

- A. The warranty period shall be one (1) year from substantial completion for the project for all hardware unless noted otherwise
- B. The warranty period for exit devices shall be at least five (5) years from substantial completion for the project.
- C. The warranty period for manual door closers shall be at least ten (10) years from substantial completion for the project.

PART 2 - PRODUCTS

2.1 GENERAL HARDWARE REQUIREMENTS

- A. Required Finish Hardware: Contractor shall furnish all finish hardware required for the building. Hardware not specified for a particular opening shall be furnished under this Section and shall conform to hardware for similar openings elsewhere in the building. The manufacturers specified are required for the products given. Manufacturer substitution will not be acceptable.
- B. In addition to requirements of the hardware groups attached, comply with the following requirements.
 - 1. Select style and features of each item to suit configuration and construction of door and frame and door operation indicated
 - 2. Coordinate hardware requirements with electrical requirements in the NEC.
 - 3. Provide rubber silencers for hollow metal frames, three for single doors and two for double doors.
 - 4. The following hardware items shall be **thru-bolted** on all doors:
 - a. Rim-type exit devices thru-bolted at hinge and latch sides.
 - b. Door closers thru-bolted on all doors.
 - c. Door pulls thru-bolted on all doors.
- C. Fasteners: Provide all fasteners required for secure installation.
 - 1. Select fasteners appropriate to substrate and material being fastened.
 - 2. Use machine screws unless otherwise indicated.
 - 3. Use Phillips flathead screws unless otherwise indicated.
 - 4. Use wood screws for installation in wood.
 - 5. Exposed screws: Match hardware finish.
 - 6. Use fasteners impervious to corrosion outdoors and on exterior doors.
 - 7. Use through-bolts where indicated.

- a. Where bolt head or nut is exposed in finished work, provide the same finish as hardware on that side of the door and use sex screw fasteners.
- b. Use through-bolts where it is not possible to reinforce substrate adequately and at all door closers, hold-opens, door pulls and rim-type exit devices.
- 8. Use expansion shield anchors in concrete and masonry.

D. Finish on all exposed metal items:

- 1. Butts - satin chrome - US 26D or satin finish stainless steel - US 32D.
- 2. Locks and latches - satin finish stainless steel - US 32D.
- 3. Deadlocks - satin chrome - US 26D.
- 4. Exit Devices - satin finish stainless steel - US 32D.
- 5. Flush Bolts and Push/Pulls - satin finish stainless steel - US 32D.
- 6. Closers - metallic painted metal to match satin finish stainless steel.
- 7. Armor and Mop Plates - .050" satin finish stainless steel.
- 8. Overhead Stops – satin finish stainless steel – US 32D.

2.2 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

- 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.3 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

- 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

B. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design" and COMAR 09.12.53, Maryland Accessibility Code.

- 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
- 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.

- c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
- 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
- 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.4 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.
 - 1. Door hardware is scheduled in Part 3 and on the Drawings.

2.5 HINGES

- A. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be considered acceptable:
 - 1. Hager Hinge Company
 - 2. McKinney Products Company
 - 3. Stanley Hardware Division / The Stanley Works
- B. Interior Butt Hinges:
 - 1. Interior hinges shall be standard weight (.134 or .146 ga.), or heavy-duty (.180 or .190 ga.), five-knuckle, two ball bearing for standard and four ball bearing for heavy-duty, stainless steel, full mortise type with stainless steel, non-removable pin.
 - 2. Dimensions: As indicated, within limits prescribed by ANSI A 156.7.
 - a. Size(s): 4-1/2" x 4-1/2", minimum. Doors 3'-2" and wider shall receive 5" x 4-1/2" hinges.
 - 3. Quantity: Provide minimum of 3 hinges on each door; add one hinge for each 30" height above 90" door height.
 - 4. Screws: For mineral core, fire rated doors, use cadmium plated sex-bolts.
- C. Exterior Butt Hinges:
 - 1. Exterior hinges shall be heavy weight (.180 or .190 ga.), five-knuckle, two-ball bearing, stainless steel, full mortise type with stainless steel, non-removable pin.
 - 2. Dimensions: As indicated, within limits prescribed by ANSI A 156.7.
 - a. Size(s): 4-1/2" x 4-1/2", minimum. Doors 3'-2" and wider shall receive 5" x 4-1/2" hinges.
 - 3. Quantity: Provide minimum of 3 hinges on each door; add one hinge for each 30" height above 90" door height.

2.6 CONTINUOUS HINGES

- A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
- B. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
 - 1. Equal to Roton 780-266HD Heavy Duty Full Mortise Hinge.
 - 2. Provide fire rated units equal to specified fire ratings for the corresponding openings.

2.7 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Mortise Locks: Minimum 3/4-inch latchbolt throw.
 - 2. Deadbolts: Minimum 1-inch bolt throw.
- C. Lock Backset: 2-3/4 inches unless otherwise indicated.
- D. Lock Trim:
 - 1. Levers: Provide on all locks and latch sets. Cold forged and reinforced stainless steel.
 - 2. Escutcheons (Roses): Through-bolted, heavy cold forged stainless steel.
 - 3. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Provide strike for each latch bolt and lock bolt.
 - 2. Use wrought box strikes
 - 3. In floors, use dustproof strikes unless threshold construction provides non-recess strike.
- F. Mortise Locks: BHMA A156.13; Operational Grade 1 Security Grade 1; wrought steel case with armored front; stainless steel latch bolt; Series 1000.
 - 1. Basis of Design: Series ML2000 as manufactured by Corbin Russwin.
 - 2. Products from the following manufacturers, provided they comply with the requirements of the contract documents will be considered acceptable:
 - a. Corbin Russwin Division of Assa Abloy
 - b. BEST Division of Dormakaba
 - c. Schlage Division of Allegion

2.8 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; Grade 1; motor or solenoid driven; with strike that suits frame; wrought steel case; armored front; stainless steel latch bolt.
 - 1. Basis of Design: Series ML20900 ECL as manufactured by Corbin Russwin.
 - 2. Products from the following manufacturers, provided they comply with the requirements of the contract documents will be considered acceptable:
 - a. Corbin Russwin Division of Assa Abloy
 - b. BEST Division of Dormakaba
 - c. Schlage Division of Allegion
 - 3. Provide lock trim matching mechanical mortise locks

2.9 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; Grade 1; minimum 3/4-inch throw; designed for mortising into door edge.
 - 1. Products from the following manufacturers, provided they comply with the requirements of the contract documents will be considered acceptable:
 - a. Corbin Russwin Division of Assa Abloy
 - b. AdamsRite Division of Assa Abloy
 - c. Schlage Division of Allegion
 - 2. Center lower actuator 12 inches from the door bottom and center the upper actuator 72 inches from the door bottom.

2.10 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
 - 1. Architectural grade, touch-bar type, constructed completely of stainless steel
 - 2. Rim & Mortise Type Manual Latch Retraction Basis of Design: Von Duprin 99 Series
 - 3. Rim & Mortise Type Electric Latch Retraction Basis of Design: Von Duprin QEL-99 Series
 - 4. Equivalent products from other manufacturers will be considered.
 - 5. At exterior door pairs with removable mullions, provide rim mounted devices.
 - 6. At exterior single doors, provide rim mounted devices
 - 7. Provide devices with night latch (rim cylinder) function where indicated.
 - 8. Provide only keyed cylinder dogging where indicated.

2.11 LOCK CYLINDERS

- A. Lock Cylinders: Compatible with Locksets and Accessories, and compatible to accept 7-pin SFIC cores.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.

1. Core Type: 7-pin SFIC

- a. BEST Small Format C series cores; 1C standard

- C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.12 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
- B. Provide cylinders and 7 pin cores by BEST lock and key into HCPSS Grand Master Key System and into existing keying system of each school.
 1. The Contractor shall hire a bonded and insured Locksmith meeting the quality requirements listed in Division 1 of the specifications.
 2. The Owner shall provide temporary construction (green) cores with all new doors.
 3. The Contractor shall provide permanent cores to the Locksmith for installation.
 4. The Contractor's Locksmith shall remove and turn over to the Owner the temporary cores, and install the permanent cores.
- C. Provide the following key quantities:
 1. Standard Keys: Provide two keys per lock.
 2. Master Keys: N/A
 3. Submaster Keys: N/A
- D. Existing System:
 1. Key locks to existing keying system of each school. School system will supply core mark and key way for each school during construction.
- E. Keyed Differently: Key each lock differently unless otherwise directed.
- F. Keys: Match owner standard material for keys.
 1. Stamping: Permanently inscribe each key with number as directed by the Owner

2.13 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.
 1. Products from the following manufacturers, provided they comply with the requirements of the contract documents, will be among those considered acceptable:
 - a. Rockwood Manufacturing Division of Assa Abloy
 - b. Ives Division of Allegion
 - c. Hager Companies
 2. Protection Plates:

- a. Stainless steel; 0.050 inch thick
- b. Satin finish
- c. Kick Plates: 8 inches high by 2 inches less than door width
- d. Armor Plates: 36 inches high by 2 inches less than door width
- e. Bevel 3 sides
- f. Fasten with countersunk, flat head screws

3. Push / Pull Plates

- a. Push Plates: 3 inches wide by 15 inches high by 1/8 inch thick cold-forged stainless steel with rounded edges. Provide cut out for cylinder or thumbturn as required.
- b. Pull Plates: 3 inches wide by 15 inches high by 1/8 inch thick cold-forged stainless steel with rounded edges. Provide cut out for cylinder or thumbturn as required.
- c. All door pulls shall be through-bolted.

4. Special-Purpose Pulls: Where indicated, provide Vandal-Proof pulls. Provide pulls compatible with the exit devices provided.

- a. Black plastisol coated grip
- b. Through-bolted
- c. US32D Finish
- d. VR910DT and VR910NL as manufactured by the Ives Division of Allegion. Equivalent products from other manufacturers will be considered.

2.14 ACCESSORIES FOR PAIRS OF DOORS

- A. Astragals: BHMA A156.22.

2.15 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; Grade 1. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Products from the following manufacturers, provide they comply with requirements of the contract documents, will be considered acceptable:

- a. Norton Division of Assa Abloy - 7570 Series
- b. LCN Division of Allegion - 4000 Series
- c. Yale Division of Assa Abloy - 4400 Series
- d. Sargent Division of Assa Abloy - 281 Series

2.16 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire-alarm system for labeled fire-rated door assemblies.

1. Basis of design: Rixon Division of Assa Abloy - 900 Series. Equivalent products from other manufacturers will be considered.

2.17 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

1. Products from the following manufacturers, provided they comply with the requirements of the contract documents, will be considered acceptable.
 - a. Sargent Division of Assa Abloy - 590 Series
 - b. Glynn Johnson Division of Allegion - 90 Series
 - c. Rixon Division of Assa Abloy - #9 Series

2.18 WALL AND FLOOR STOPS

A. Wall-mounted and floor-mounted stops: BHMA A156.16

1. Products from the following manufacturers, provided they comply with the requirements of the contract documents, will among those considered acceptable:
 - a. Ives Division of Allegion
 - b. Rockwood Manufacturing Division of Assa Abloy
 - c. Hager Companies
2. Stainless steel escutcheons with gray resilient components.

2.19 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Products from the following manufacturers, provided they comply with the requirements of the contract documents, will among those considered acceptable:
 - a. Pemko Division of Assa Abloy
 - b. Zero International Division of
 - c. Hager Companies

B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:

1. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
2. Gasketing on Double Doors: 0.50 cfm per foot of door opening.

C. Weatherstripping:

1. At jambs and head: Provide Pemko S88xx or equivalent.
2. Finish: To be selected by Architect from manufacturer's full standard range.

D. Continuous Head Drip

1. Provide a continuous, surface-applied head drip set in sealant where indicated in the hardware sets, and where door openings are not covered by an overhang, bulkhead, or other projection.
2. Provide Pemko 346x or equivalent
3. Finish: To be selected by Architect from manufacturer's full standard range.

2.20 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Products from the following manufacturers, provided they comply with the requirements of the contract documents, will among those considered acceptable:
 - a. Pemko Division of Assa Abloy
 - b. Zero International Division of
 - c. Hager Companies
2. **All thresholds shall meet the requirements of the most recent applicable accessibility code.**
3. **Thresholds at all exterior doors shall be an assembly, "panic" thresholds with integral stop and seal. Applied threshold stop strips are NOT acceptable.**
4. Basis of Design: An assembly consisting of:
 - a. Pemko 2006_V_ on the exterior side of the door
 - b. Pemko 253_ on the interior side of the door.
5. Thresholds shall be ribbed aluminum, formed to accommodate changes in elevation and to fit door hardware and frames.
6. **Provide thresholds in widths (from interior to exterior) that conceal transitions in finished flooring material, or patches in slabs where in-slab hardware was previously removed.**
7. Miter and scribe both ends of thresholds to suite jamb condition and present a neat, finished appearance
8. Furnish fasteners in type and quantity recommended by the manufacturer for the substrates present.
9. Set all exterior thresholds in a full bed of sealant.

B. Gymnasium Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Basis of Design: Thermal Barrier Saddle Commercial threshold as manufactured by Pemko or equivalent product capable of creating a sloped transition from gymnasium flooring to exterior sidewalk, and is thermally broken.
2. Drawings illustrate Pemko 2476x6.
3. Install per requirements of standard ribbed thresholds.

2.21 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

1. Removable Steel Mullions:
 - a. Provide units with top and bottom mounting fittings. Unit is removable with hex key or key operation of mortise cylinder. Unit self-locks when reinstalled without use of key.

- b. Include mortise cylinder with keyed unit.
- c. Basis of Design: Von Duprin 4954 and KR4954 (verify height). Equivalent products from other manufacturers will be considered.
- d. **Field verify height at openings with automatic operators to remain and provide units that clear automatic operator covers when removed. Provide mounting plates as required at the head of units to create this clearance.**

2.22 AUXILIARY ELECTRIFIED DOOR HARDWARE

A. Auxiliary Electrified Door Hardware:

1. Electric Hinges:

- a. Manufacturers: Products from the following manufacturers, provided they comply with the requirements of the contract documents, will be considered acceptable:

- 1) Hager Hinge Company
- 2) McKinney Products Company
- 3) Stanley Hardware Division / The Stanley Works

- b. Provide electric hinges in gauges and sizes per butt hinge requirements.

2. Electric Power Transfer: Compatible with electrified hardware, frame, and door. Mount into door edge. Provide one device at each door leaf with electrified hardware.

- a. Basis of Design: Dorma ES 105. Equivalent products from other manufacturers will be considered.

3. Electric Power Supply: Compatible with electrified hardware, and any security equipment. Provide one power supply per each door opening with electrified hardware.

- a. Basis of Design: Von Duprin PS914-2RS. Equivalent products from other manufacturers will be considered.

2.23 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.

- 1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.24 FINISHES

- A. Provide finishes complying with BHMA A156.18 and paragraph 2.1 of this section.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Factory or shop-prepare all work for installation of hardware.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Steel Doors and Frames: ANSI/SDI A250.8.
 - a. Exception: As required to comply with applicable regulations.
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying schedule.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Owner.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.
- J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
 2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
 3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.8 DOOR HARDWARE SCHEDULE

- A. Centennial Lane Elementary School Hardware Sets (See also sheet G1.1)

CL-H1

Double Steel Entry Opening

Protect Existing Card Reader to Remain

Card Reader or Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 5 Heavy Duty Hinge
- 1 Electric Hinge
(For Active Leaf)
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging
(Fail Secure) (For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 2 Heavy Duty Closers
- 2 Overhead Stop
- 1 Removable Mullion
(Via Hex Key)
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

CL-H2

Single Steel Exit-Only Opening

No Card Reader

Interior Exit Device Always Free for Immediate Egress

- 3 Heavy Duty Hinge
- 1 Rim Set Exit Device with Manual Latch Retraction & Less Dogging
- 1 Heavy Duty Closer
- 1 Wall Stop
- 1 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 1 Door Bottom Sweep

CL-H3

Double Aluminum Entry Door in Existing Frame

No Card Reader

Gasketing by Alum. Door Manufacturer

Entry Only if Exit Devices are Dogged

Exit Devices of Both Leaves Always Free for Immediate Egress

- 2 Heavy Duty Continuous Hinge
- 2 Rim-Set Exit Device with Manual Latch Retraction & Cylinder Dogging
- 2 Permanent Core
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core

- 1 Exterior Vandal Pull
- 2 Heavy Duty Closers
- 2 Overhead Stop
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep

CL-H4

Double Aluminum Entry Door in Existing Frame

No Card Reader

Gasketing by Alum. Door Manufacturer

Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 2 Heavy Duty Continuous Hinge
- 1 Rim-Set Exit Device with Manual Latch Retraction & Cylinder Dogging
- 1 Rim-Set Exit Device with Manual Latch Retraction, Rim Cylinder & Cylinder Dogging
- 4 Permanent Core
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core
- 1 Exterior Vandal Pull
- 2 Heavy Duty Closers
- 2 Overhead Stop
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep

CL-H5

Single Steel Storage Opening

No Card Reader

Key to Gain Entry

Interior Lever Always Free for Immediate Egress

- 3 Heavy Duty Hinge
- 1 Storage Function Mortise Lockset with Lever Set
- 1 Permanent Core
- 1 Heavy Duty Closer
- 1 Wall Stop
- 1 Weather Gasketing Set
- 1 Threshold Assembly

CL-H6

Double Steel Opening At Kitchen

No Card Reader

Key to Gain Entry

Interior Lever Always Free for Immediate Egress

- 6 Heavy Duty Hinge
- 1 Storage Function Mortise Lockset with Lever Set
- 1 Permanent Core
- 1 Astragal
(For Active Leaf)
- 2 Manual Flush Bolt
(For Inactive Leaf)
- 1 Dust Proof Strike
(For Inactive Leaf)
- 2 Heavy Duty Closer
- 2 Overhead Stop with Hold-Open Function
- 2 Armor Plate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 2 Door Bottom Sweep

CL-H7

Double Aluminum Entry Door in Existing Frame

No Card Reader

Gasketing by Alum. Door Manufacturer

Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 2 Heavy Duty Continuous Hinge
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Dogging
- 1 Rim-Set Exit Device with Manual Latch Retraction, Rim Cylinder & Hex Dogging
- 2 Permanent Core
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core
- 1 Exterior Vandal Pull
- 2 Heavy Duty Closers
- 2 Overhead Stop
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep

CL-H8

Double Aluminum Inner Vestibule Door in Existing Frame

No Card Reader

Gasketing by Alum. Door Manufacturer

Vandal Pull Entry through Either Leaf

Both Leaves Always Free For Immediate Egress

- 2 Heavy Duty Continuous Hinge
- 2 Push Plates
- 2 Exterior Vandal Pull
- 2 Heavy Duty Closer
- 2 Overhead Stop
- 1 Threshold Assembly
- 2 Door Bottom Sweep

CL-H9

Double Steel Opening

New Card Reader

Card Reader or Key to Gain Entry

Exit Devices of Both Leaves Always Free for Immediate Egress

- 5 Heavy Duty Hinge
- 1 Electric Hinge
(For Active Leaf)
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging
(Fail Secure) (For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 2 Heavy Duty Closers
- 2 Overhead Stop
- 1 Removable Mullion
(Via Hex Key)
- 2 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

CL-H10

Double Steel Door With Screen at Kitchen

No Card Reader

Key or Push Plate to Gain Entry

Thumbturn and Pull Plate for Egress

- 6 Heavy Duty Hinge
- 1 Storage Function Mortise Lockset with Lever Set
(For Active Leaf)
- 1 Permanent Core
- 1 Astragal
(For Active Leaf)
- 2 Manual Flush Bolt
(For Inactive Leaf)
- 1 Dust Proof Strike
(For Inactive Leaf)
- 2 Heavy Duty Closer
- 2 Overhead Stop
- 2 Kickplate on Exterior Face

CL-H11

Double Steel Entry Opening

No Card Reader

Entry Only if Exit Devices are Dogged

Exit Devices of Both Leaves Always Free for Immediate Egress

- 6 Heavy Duty Hinge
- 2 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull
- 2 Heavy Duty Closers
- 2 Overhead Stop
- 1 Removable Mullion
(Via Hex Key)
- 2 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

B. Waterloo Elementary School Hardware Sets (See also sheet G1.2)

WL-H1

Double Steel Entry Opening

Protect Existing Card Reader to Remain

Card Reader or Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 5 Heavy Duty Hinge
- 1 Electric Hinge
(For Active Leaf)
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging
(Fail Secure) (For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core
- 2 Heavy Duty Closers
- 1 Overhead Stop
(For Active Leaf)
- 1 Wall Stop
(For Inactive Leaf)
- 2 Kickplate
- 1 Weather Gasketing Set
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WL-H1A

Double Steel Entry Opening

Protect Existing Card Reader to Remain

Card Reader or Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 5 Heavy Duty Hinge
- 1 Electric Hinge
(For Active Leaf)
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging
(Fail Secure) (For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core

- 2 Heavy Duty Closers
- 2 Overhead Stop
(For Active Leaf)
- 2 Kickplate
- 1 Weather Gasketing Set
- 1 Continuous Head Drip @ Opening 107 Only
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WL-H2

Double Steel Storage Opening

No Card Reader

Key to Gain Entry through Active Leaf

Interior Lever on Active Leaf Always Free for Immediate Egress

- 6 Heavy Duty Hinge
- 1 Storage Function Mortise Lockset with Lever Set
(For Active Leaf)
- 1 Permanent Core
- 1 Astragal
(For Active Leaf)
- 2 Manual Flush Bolt
(For Inactive Leaf)
- 1 Dust Proof Strike
(For Inactive Leaf)
- 2 Overhead Stop
- 2 Kickplate
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 2 Door Bottom Sweep

WL-H3

Single Steel Door With Screen at Kitchen

No Card Reader

Key or Push Plate to Gain Entry

Thumbturn and Pull Plate for Egress

- 3 Heavy Duty Hinge
- 1 Mortise Deadbolt with Interior Thumbturn
- 1 Permanent Core
- 1 Push/Pull Plate Set
- 1 Heavy Duty Closer
- 1 Overhead Stop
- 1 Kickplate on Exterior Face

WL-H4

Single Steel Opening at Kitchen

New Card Reader

Card Reader or Key to Gain Entry

Interior Lever Always Free for Immediate Egress

- 2 Heavy Duty Hinge
- 1 Electric Hinge
- 1 Electric Storage Function Mortise Lockset with Lever Set
(Fail Secure)
- 1 Permanent Core
- 1 Heavy Duty Closer
- 1 Overhead Stop with Hold-Open Function
- 1 Armor Plate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 1 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WL-H5

Double Steel Storage Opening

No Card Reader

Key to Gain Entry through Active Leaf

Interior Exit Device on Active Leaf Always Free for Immediate Egress

- 6 Heavy Duty Hinge
- 1 Mortise Set Exit Device with Manual Latch Retraction, Rim Cylinder, & Less Dogging
(For Active Leaf)
- 2 Permanent Core
- 1 Exterior Trim Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 1 Astragal
(For Active Leaf)
- 1 Heavy Duty Closer
(For Active Leaf)
- 2 Overhead Stop with Hold-Open Function
- 2 Manual Flush Bolt
(For Inactive Leaf)
- 1 Dust Proof Strike
(For Inactive Leaf)
- 2 Overhead Stop
- 2 Kickplate on Interior Face
- 1 Continuous Head Drip
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 2 Door Bottom Sweep

WL-H6

Single Steel Exit-Only Door In Existing Frame

No Card Reader

Interior Exit Device Always Free for Immediate Egress

- 1 Heavy Duty Continuous Hinge
- 1 Rim Set Exit Device with Manual Latch Retraction & Less Dogging
- 1 Heavy Duty Closer
- 1 Wall Stop
- 1 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 1 Door Bottom Sweep

WL-H7

Single Steel Door in Existing Frame

New Card Reader

Card Reader or Key to Gain Entry

Interior Exit Device Always Free for Immediate Egress

- 1 Heavy Duty Continuous Hinge
- 1 Power Transfer
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Less Dogging
(Fail Secure)
- 2 Permanent Core
- 1 Exterior Vandal Pull with Cylinder Cut-Out
- 1 Heavy Duty Closer
- 1 Wall Stop
- 1 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 1 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WL-H8

Existing Single Steel Opening

New Card Reader

- 1 Power Transfer
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Less Dogging
(Fail Secure)
- 2 Permanent Core
- 1 Exterior Vandal Pull with Cylinder Cut-Out
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WL-H9

Existing Double Steel Opening

Existing Card Reader

1 Power Transfer

- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging (Fail Secure) (For Active Leaf)

2 Permanent Core

- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging

- 1 Exterior Vandal Pull with Cylinder Cut-Out (For Active Leaf)

1 Power Supply

(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WL-H10

Single Steel Door in Existing Frame

New or Existing Card Reader

Card Reader Only to Gain Entry

Interior Exit Device Always Free for Immediate Egress

- 1 Heavy Duty Continuous Hinge

1 Power Transfer

- 1 Rim-Set Exit Device with Electric Latch Retraction & Less Dogging (Fail Secure)

- 1 Exterior Vandal Pull

- 1 Heavy Duty Closer

- 1 Wall Stop

- 1 Kickplate on Interior Face

- 1 Weather Gasketing Set

- 1 Threshold Assembly

- 1 Door Bottom Sweep

1 Power Supply

(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WL-H11

Double Steel Entry Door in Existing Frame

Protect Existing Card Reader to Remain

Card Reader or Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 2 Heavy Duty Continuous Hinge

1 Power Transfer

(For Active Leaf)

- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging (Fail Secure) (For Active Leaf)

2 Permanent Core

- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging

- 1 Exterior Vandal Pull with Cylinder Cut-Out (For Active Leaf)

- 2 Heavy Duty Closers
- 2 Overhead Stop
- 2 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
(Notch for Existing Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

C. Worthington Elementary School Hardware Sets (See also sheet G1.3)

WT-H1

Double Aluminum Entry Doors in Existing Aluminum Frame

No Card Reader

Gasketing by Alum. Frame Manufacturer

Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 2 Heavy Duty Continuous Hinge
- 1 Rim-Set Exit Device with Manual Latch Retraction, Rim Cylinder & Hex Key Dogging
(For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core
- 2 Heavy Duty Closers
- 1 Overhead Stop
(For Active Leaf)
- 1 Wall Stop
(For Inactive Leaf)
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep

WT-H2

Double Aluminum Entry Opening

Protect Existing Card Reader to Remain

Gasketing by Alum. Frame Manufacturer

Card Reader or Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 2 Heavy Duty Continuous Hinge
- 1 Power Transfer
(For Active Leaf)
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging
(Fail Secure) (For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)

- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core
- 2 Heavy Duty Closers
- 1 Overhead Stop
(For Active Leaf)
- 1 Wall Stop
(For Inactive Leaf)
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WT-H3

Single Steel Exit-Only Opening

No Card Reader

Interior Exit Device Always Free for Immediate Egress

- 3 Heavy Duty Hinge
- 1 Rim Set Exit Device with Manual Latch Retraction & Less Dogging
- 1 Heavy Duty Closer
- 1 Wall Stop
- 1 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 1 Door Bottom Sweep

WT-H3A

Single Steel Exit-Only Opening

No Card Reader

Interior Exit Device Always Free for Immediate Egress

- 3 Heavy Duty Hinge
- 1 Rim Set Exit Device with Manual Latch Retraction & Less Dogging
- 1 Heavy Duty Closer
- 1 Wall Stop
- 1 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Continuous Head Drip
- 1 Threshold Assembly
- 1 Door Bottom Sweep

WT-H4

Single Steel Opening

New or Existing Card Reader

Card Reader Only to Gain Entry

Interior Exit Device Always Free for Immediate Egress

- 2 Heavy Duty Hinge
- 1 Electric Hinge
- 1 Rim-Set Exit Device with Electric Latch Retraction & Less Dogging
(Fail Secure)
- 1 Exterior Vandal Pull
- 1 Heavy Duty Closer

- 1 Wall Stop
- 1 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Continuous Head Drip
- 1 Threshold Assembly
- 1 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WT-H5

Double Steel Storage Opening

No Card Reader

Key to Gain Entry through Active Leaf

Interior Exit Device on Active Leaf Always Free for Immediate Egress

- 6 Heavy Duty Hinge
- 1 Mortise Set Exit Device with Manual Latch Retraction, Rim Cylinder, & Less Dogging
(For Active Leaf)
- 2 Permanent Core
- 1 Exterior Trim Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 1 Astragal
(For Active Leaf)
- 1 Heavy Duty Closer
(For Active Leaf)
- 2 Overhead Stop with Hold-Open Function
- 2 Manual Flush Bolt
(For Inactive Leaf)
- 1 Dust Proof Strike
(For Inactive Leaf)
- 2 Overhead Stop
- 2 Kickplate on Interior Face
- 1 Continuous Head Drip
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 2 Door Bottom Sweep

WT-H6

Single Steel Door in Existing Frame

New or Existing Card Reader

Card Reader or Key to Gain Entry

Interior Exit Device Always Free for Immediate Egress

- 1 Heavy Duty Continuous Hinge
- 1 Power Transfer
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder, & Less Dogging
(Fail Secure)
- 1 Exterior Vandal Pull with Cylinder Cut-Out
- 1 Heavy Duty Closer

- 1 Wall Stop
- 1 Kickplate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 1 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WT-H7

Double Steel Door With Screen at Kitchen

No Card Reader

Key or Push Plate to Gain Entry

Thumbturn and Pull Plate for Egress

- 6 Heavy Duty Hinge
- 1 Storage Function Mortise Lockset with Lever Set
(For Active Leaf)
- 1 Permanent Core
- 1 Astragal
(For Active Leaf)
- 2 Manual Flush Bolt
(For Inactive Leaf)
- 1 Dust Proof Strike
(For Inactive Leaf)
- 2 Heavy Duty Closer
- 2 Overhead Stop
- 2 Kickplate on Exterior Face

WT-H8

Double Steel Opening at Kitchen

New Card Reader

Card Reader or Key to Gain Entry

Interior Lever Always Free for Immediate Egress

- 5 Heavy Duty Hinge
- 1 Electric Hinge
- 1 Electric Storage Function Mortise Lockset with Lever Set
(Fail Secure)
- 1 Permanent Core
- 1 Astragal
(For Active Leaf)
- 2 Manual Flush Bolt
(For Inactive Leaf)
- 1 Dust Proof Strike
(For Inactive Leaf)
- 2 Heavy Duty Closer
- 2 Overhead Stop with Hold-Open Function
- 2 Armor Plate on Interior Face
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WT-H9

Single Steel Storage Opening

No Card Reader

Key Only to Gain Entry

Interior Level Always Free for Immediate Egress

- 3 Heavy Duty Hinge
- 1 Storage Function Mortise Lockset with Lever Set
- 1 Permanent Core
- 1 Heavy Duty Closer
- 1 Overhead Stop
- 1 Kickplate
- 1 Weather Gasketing Set
- 1 Threshold Assembly
- 1 Door Bottom Sweep

WT-H10

Double Steel Entry Opening

Protect Existing Card Reader to Remain

Card Reader or Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 5 Heavy Duty Hinge
- 1 Electric Hinge
(For Active Leaf)
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging
(Fail Secure) (For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core
- 2 Heavy Duty Closers
- 1 Overhead Stop
(For Active Leaf)
- 1 Wall Stop
(For Inactive Leaf)
- 2 Kickplate
- 1 Weather Gasketing Set
- 1 Continuous Head Drip
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

WT-H10A

Double Steel Entry Opening

Protect Existing Card Reader to Remain

Card Reader or Key to Gain Entry through Active Leaf

Exit Devices of Both Leaves Always Free for Immediate Egress

- 5 Heavy Duty Hinge
- 1 Electric Hinge
(For Active Leaf)
- 1 Rim-Set Exit Device with Electric Latch Retraction, Rim Cylinder & Hex Key Dogging
(Fail Secure) (For Active Leaf)
- 2 Permanent Core
- 1 Rim-Set Exit Device with Manual Latch Retraction & Hex Key Dogging
- 1 Exterior Vandal Pull with Cylinder Cut-Out
(For Active Leaf)
- 1 Key-removable Mullion
- 1 Mortise Cylinder
- 1 Permanent Core
- 2 Heavy Duty Closers
- 2 Wall Stop
- 2 Kickplate
- 1 Weather Gasketing Set
- 1 Threshold Assembly
(Notch for Removable Mullion)
- 2 Door Bottom Sweep
- 1 Power Supply
(Incl. Accessories Between Building Power, Hardware, & Card Reader)

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Glass for doors, sidelites and transoms in hollow metal frames, and interior borrowed lites.
 - 2. Glazing sealants and accessories.
- B. Related Requirements:
 - 1. Section 081113 "Hollow Metal Doors and Frames"
 - 2. Section 084113 "Aluminum Entrances and Storefronts"

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.
- E. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of the following products; 12 inches square.
 - 1. Insulating glass.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- B. Product Certificates: For glass.
- C. Product Test Reports: For insulating glass and polycarbonate sheet glazing, for tests performed by a qualified testing agency.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
 - 1. Provide products permanently marked either on spacers or at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
 - 1. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C920, and other test methods where applicable.
- E. Source Limitations:
 - 1. Obtain insulating glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.

2. Obtain glazing accessories from one source for each product and installation method indicated.
3. Obtain polycarbonate sheet glazing from one manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.10 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Tempered Float Glass and Insulating Glass: Products from the following manufacturers, provided they comply with the requirements of the contract documents, will be considered acceptable:
 1. J.E. Berkowitz, LP
 2. Cardinal Glass Industries
 3. Guardian Industries Corp.
 4. Vitro Architectural Glass (PPG Glass, Inc.)

5. Pilkington North America
6. Viracon, Inc.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
 1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
 - a. Basic Wind Speed: 85 mph.
 - b. Importance Factor: 1.15.
 - c. Exposure Category: B.
 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for Wind Zone 1 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
 1. Large-Missile Test: For glazing located within 30 feet of grade.
 2. Small-Missile Test: For glazing located more than 30 feet above grade.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: "Glazing Manual."
 - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
 - 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 - 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
- D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Type I, Class 1 (clear), Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear.

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard nonmetallic (warm edge) black spacer.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products from the following manufacturers, provided they comply with the requirements of the contract documents, will be considered acceptable:
 - a. Tremco Incorporated
 - b. Pecora Corporation
 - c. Dow Corning Corporation

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 INSULATING GLASS SCHEDULE

- A. Glass Type GL-1: Low-E-coated, clear insulating, laminated glass.
 - 1. Basis-of-Design Product: Vitro Architectural Glazing; Solarban 60 on Clear 6mm (2).
 - 2. Overall Unit Thickness: 1 inch.
 - 3. Minimum Thickness of Each Glass Lite: 1/4 inch.
 - 4. Outdoor Lite: Fully tempered float glass.
 - 5. Interspace Content: Air.
 - 6. Indoor Lite: Clear laminated glass with two (2) plies of fully tempered float glass.
 - a. Minimum Thickness of Each Glass Ply: 3mm
 - b. Interlayer Thickness: 0.045 inch
 - 7. Low-E Coating: Pyrolytic or sputtered on second surface. (Inside face of Outside Lite)
 - 8. Winter Nighttime U-Factor: 0.29 maximum.
 - 9. Visible Light Transmittance: 70 percent minimum.
 - 10. Solar Heat Gain Coefficient: 0.39 maximum.

11. Safety glazing required.

END OF SECTION 088000

SECTION 092400 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior horizontal and nonvertical plasterwork (stucco) adjacent to existing exterior horizontal plasterwork (stucco).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples: For each type of factory-prepared finish coat and for each color and texture specified.
- D. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color and texture specified.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockup to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution. **New exterior plasterwork (stucco) is to match existing adjacent exterior plasterwork (stucco).**
 - 1. Build mockups for cement plastering, including accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 FIELD CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
 - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 - 2. Apply plaster when ambient temperature is greater than 40 deg F.
 - 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or AC308 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
 - 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
 - 1. Depth: 2 inches.
- E. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.

2.2 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.

1. Flat-Rib Lath: Rib depth of not more than 1/8 inch, 3.4 lb/sq. yd..
- B. Paper Backing: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable paper.
 1. Provide paper-backed lath at exterior locations.

2.3 ACCESSORIES

- A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Metal Accessories:
 1. Casing Beads: Fabricated from zinc or zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
 2. Control Joints: Fabricated from zinc or zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
 3. Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
 4. Two-Piece Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.

2.4 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster.
- C. Bonding Compound: ASTM C 932.
- D. Fasteners for Attaching Metal Lath to Substrates: ASTM C 1063.
- E. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.
- F. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

2.5 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I.
 1. Color for Finish Coats: White.
- B. Colorants for Job-Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color as required to match adjacent existing plasterwork.

- C. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- D. Sand Aggregate: ASTM C 897.
 - 1. Color for Job-Mixed Finish Coats: White.
- E. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.
 - 1. Color: Custom Color as selected by Architect to match existing adjacent plasterwork..

2.6 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
 - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Job-Mixed Finish-Coat Mixes:
 - 1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 1-1/2 to 2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
- D. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

- B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLATION, GENERAL

- A. Sound-Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.

3.4 INSTALLING METAL LATH

- A. Metal Lath: Install according to ASTM C 1063.
 - 1. Flat-Ceiling and Horizontal Framing: Install flat-rib lath.

3.5 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Control Joints: Locate as approved by Architect for visual effect and as follows:
 - 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft..
 - b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft..
 - 2. At distances between control joints of not greater than 18 feet o.c.
 - 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
 - 4. Where control joints occur in surface of construction directly behind plaster.
 - 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.6 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
 - 1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
 - 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 - 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on substrates for direct application of plaster.
- C. Ceilings; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork and matching total thickness of adjacent existing plasterwork as follows:
 - 1. Portland cement mixes.
- D. Plaster Finish Coats: Apply to provide finish to match existing adjacent plasterwork.**

3.7 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 092400

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Note: Existing whole acoustical panels will be salvaged for reinstallation. Only new partial/cut acoustical panels will be provided.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Initial Selection: For components with factory-applied finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch- square Samples of each type, color, pattern, and texture.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.
- C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

- A. Salvaged Materials: The Contractor shall carefully reinstall whole acoustical panels removed during demolition. Contractor shall replace with new panels any existing panels that were damaged during storage or that become damaged during reinstallation. Existing panels shall be indistinguishable from new panels after installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.
 - 1. **New acoustical panels shall match exactly the existing, undisturbed acoustical panels to remain or are being reinstalled. New panels shall be indistinguishable from salvaged panels.**
 - 2. **Provide new metal suspension system where frame replace has damaged existing system. All new metal suspension system shall match exactly the existing metal suspension system.**

- 3. Provide new metal edge moldings and trim where existing moldings and trim are removed or damaged by frame replacements to be incorporated into new metal suspension systems. Any new metal edge moldings or trim shall match exactly the existing metal edge moldings and trim.**

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: Class A according to ASTM E 1264.
 2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS

- A. Subject to compliance with requirements of these specifications, provide products by one of the following manufacturers:
 1. Armstrong World Industries, Inc.
 2. CertainTeed Corporation
 3. Chicago Metallic Corporation
 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide panels as follows:
 1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
 2. Type and Form: Type XX, high-density, ceramic- and mineral-base panels with scrubbable finish, resistant to heat, moisture, and corrosive fumes.
 3. Pattern: Match salvaged acoustical panels.
- D. Color: Match salvaged acoustical panels.
- E. Light Reflectance (LR): Not less than 0.75.
- F. Ceiling Attenuation Class (CAC): Not less than 40.
- G. Noise Reduction Coefficient (NRC): Not less than 0.55.
- H. Edge/Joint Detail: Match salvaged acoustical panels.
- I. Thickness: Match salvaged acoustical panels.
- J. Modular Size: Match salvaged acoustical panels.
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEM

- A. Subject to compliance with requirements of these specifications, provide products by one of the following manufacturers:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation
 - 3. Chicago Metallic Corporation
 - 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
- C. Wide-Face or Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch or 9/16-inch- wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Match adjacent existing ceiling grid.
 - 3. Face Design: Match adjacent existing ceiling grid.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Match adjacent existing ceiling grid.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Postinstalled expansion anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633, Class SC 1 (mild) service condition.
 - 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
 - 3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.

4. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch- thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.
- F. Hold-Down Clips: Manufacturer's standard hold-down.
- G. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- H. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.
- I. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- J. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Subject to compliance with requirements of these specifications, provide products by one of the following manufacturers:
 1. Armstrong World Industries, Inc.
 2. CertainTeed Corporation
 3. Chicago Metallic Corporation
 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified

in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, CISCA's "Ceiling Systems Handbook", and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
 - 1. Arrange directionally patterned acoustical panels as follows:

- a. As indicated on reflected ceiling plans.
- 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
- 3. Install hold-down clips in areas indicated below; space according to panel manufacturer's written instructions unless otherwise indicated.
 - a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
 - b. Install hold-down clips in all vestibules and in an 8 foot by 8 foot area just inside of all exterior doors without vestibules. Install hold-down clips where previously installed in the original ceiling system.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems in support of hollow metal door frame modification and replacement including

- 1. Preparation and application of paint systems on the following surfaces:

- a. All new exposed exterior and interior items to receive a painted finish.
 - b. All existing surfaces/items with a painted finish disturbed by door and frame replacement work, to restore original finishes.

- 2. Preparation and application of paint systems on the following substrates:

- a. Concrete.
 - b. Concrete masonry units (CMUs).
 - c. Steel and iron.
 - d. Galvanized metal.
 - e. Wood.
 - f. Gypsum board.
 - g. Ceramic Tile

- B. Related Requirements:

- 1. Section 081113 "Hollow Metal Doors and Frames" for shop priming hollow metal doors and frames.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Indicate VOC content.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Source Limitations:
 - 1. To the maximum extent practicable, select a single manufacturer to provide all materials required by this section, using additional manufacturers to provide systems not offered by the selected principal manufacturer.
 - 2. For each individual system: Provide primer and other undercoat paint produced by same manufacturer as finish coat. Use only thinners approved by paint manufacturer and use only within recommended limits.
- B. Applicator: Engage a firm with successful experience in painting work similar in scope to the work of this project.
 - 1. Maintain throughout duration of the work a crew of painters who are fully qualified to satisfy requirements of the specifications.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original, new, unopened packages and containers bearing the manufacturer's name and label and the following information:
 - 1. Name or title of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Manufacturer's name.

4. Contents by volume for major pigment and vehicle constituents.
5. Thinning and application instructions.
6. Color name and number.
7. Handling instructions and precautions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 90 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated to temperature within manufacturer's specified limits during application and drying periods.
- D. Provide lighting level of at least 80 footcandles measured mid-height at substrate surface.
- E. Provide continuous ventilation and heating to prevent accumulation of hazardous fumes and to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during and for 48 hours after application of finishes.

1.9 COORDINATION

- A. General: Perform painting work in proper sequence with work of other trades to avoid damage to finished work. Coordinate painted finish of exterior wall, intake louvers for thru-wall heat pump units and other louvers with mechanical sections of this specification.
- B. Primers: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates.
 1. Upon request, furnish information to other trades on characteristics of finish materials proposed for use.
 2. Provide barrier coats over incompatible primers or remove and reprime as required.
 3. Notify the architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products from the following manufacturers, provided they comply with the requirements of the contract documents, will be considered acceptable:

1. Sherwin Williams Company
2. Benjamin Moore & Company
3. McCormick Paints
4. PPG Architectural Coatings

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that surfaces and conditions are ready for work per the product manufacturer.
- B. Examine surfaces scheduled to be finished, prior to commencement of work.
 1. Report any unsatisfactory condition in writing to the contractor.
 2. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the applicator.
 3. Starting of painting work in any particular area will be construed as acceptance of surfaces and conditions within that area.
- C. Do not paint over any code-required labels, equipment identification, performance rating, name or nomenclature plates.

3.2 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMUs): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.3 PREPARATION

- A. General: Prepare and clean each **existing and new substrate condition** in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" and in "MPI Maintenance Repainting Manual" applicable to substrates and paint systems indicated. Adhesion to new and existing surfaces must be acceptable to manufacturer's standards. Perform adhesion tests as necessary to assure compliance with requirements.
- B. **Existing painted surfaces to receive new paint:** If it is determined barrier coats or other primers are not required, clean substrates to receive new paint without application of a bottom (prime) coat. Only finish coats in quantities specified are required. Additionally, remove minor brackets, fasteners, etc. not indicated to remain. Remove loose and flaking paint and address surface defects (cracks, voids, gouges, etc.). Prime areas where existing coatings have been removed or patch.
- C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- D. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- E. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- G. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 - 1. SSPC-SP 3.
- H. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- I. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

J. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Ceramic Tile Substrates:

1. Surfaces to be coated must be dry, clean, sound, and free from all contamination including loose and peeling paint, dirt, grease, oil, wax, chalk, efflorescence, mildew, rust, product fines and dust. Remove loose paint, chalk, and efflorescence by wire brushing, scraping, sanding, and/or pressure washing. Putty all nail holes and caulk all cracks and open seams. Sand all glossy, rough, and patched surfaces.
2. Sand or etch with phosphoric acid if necessary. Topcoat should be spot applied, allowed to cure overnight and then evaluated for adhesion. If acceptable proceed with application. If not, re-sand or etch.

3.4 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

1. Stir materials before application to produce a mixture of uniform density; stir as required during application.
2. Do not stir surface film into material.
3. Remove film and, if necessary, strain material before using.
4. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

3.5 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated. **Spraying of paint will not be allowed without the permission of the Architect for each location.**
2. Surface imperfections will not be acceptable. **Areas to be painted must be clean and dust-free. Dust particles in the finish coat detectible to the touch and excessive are cause for rejection of the finish coat.**
3. Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas.
 - a. If color or finish is not designated, the architect will select these from standard colors or finishes available.
4. Apply additional coats until paint film is of uniform finish, color and appearance.
 - a. Ensure that all surfaces receive a dry film thickness equivalent to those of flat surfaces. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

5. Paint tops, bottoms, and both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 6. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 7. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 8. Sand lightly between each succeeding enamel or varnish coat.
 9. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Other items as directed by Architect.

3.6 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.7 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.8 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Water-Based Light Industrial Coating System:

- a. Block Filler: Block filler, latex, interior/exterior.
 - 1) Basis of Design: Sherwin Williams Loxon Block Surfacers.
- b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
- c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5).
 - 1) Basis of Design: Sherwin Williams Pro Industrial Pre Catalyzed Water Based Epoxy.

B. Shop-Primed Steel Substrates:

1. Water-Based Light Industrial Coating System over Acrylic Primer System:

- a. Prime Coat: Shop primer specified in Section where substrate is specified.
- b. First Intermediate Coat: Primer, acrylic, anticorrosive, for metal.
 - 1) Basis of Design: Sherwin Williams Pro Industrial Pro Cryl Acrylic Primer.
- c. Second Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
- d. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5).
 - 1) Basis of Design: Sherwin Williams Pro Industrial Pre Catalyzed Water Based Epoxy.

C. Wood Substrates: Wood trim, Architectural woodwork, and Doors.

1. Water-Based Light Industrial Coating over Latex Primer System:

- a. Prime Coat: Primer sealer, latex, interior.
 - 1) Basis of Design: Sherwin Williams Premium Wall and Wood Primer.
- b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
- c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5).

- 1) Basis of Design: Sherwin Williams Pro Industrial Pre Catalyzed Water Based Epoxy.

D. Gypsum Board Substrates:

1. Water-Based Light Industrial Coating System:

- a. Prime Coat: Primer sealer, latex, interior.

- 1) Basis of Design: Sherwin Williams ProMar 200 Zero VOC Interior Latex Primer.

- b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
- c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5).

- 1) Basis of Design: Sherwin Williams Pro Industrial Pre Catalyzed Water Based Epoxy.

E. Ceramic Tile Substrates:

1. Water-Based Light Industrial Coating System:

- a. Prime Coat: Primer, waterborne, bonding primer, interior.

- 1) Basis of Design: Sherwin Williams Protective & Marine Coatings DTM Bonding Primer

- b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
- c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5).

- 1) Basis of Design: Sherwin Williams Pro Industrial Pre Catalyzed Water Based Epoxy.

3.9 EXTERIOR PAINTING SCHEDULE

A. Raw Steel and Iron Substrates:

1. Alkyd System:

- a. Prime Coat: Primer, alkyd, anticorrosive, for metal.

- 1) Basis of Design: Sherwin Williams Kem Bond HS Universal Metal Primer.

- b. Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
- c. Topcoat: Alkyd, exterior, gloss (MPI Gloss Level 6).

- 1) Basis of Design: Sherwin Williams Pro Industrial Urethane Alkyd Enamel.

B. Shop-Primed Steel and Iron Substrates:

1. Alkyd System:

- a. Prime Coat: Shop primer specified in Section where substrate is specified.
- b. First Intermediate Coat: Primer, alkyd, anticorrosive, for metal.
 - 1) Basis of Design: Sherwin Williams Kem Bond HS Universal Metal Primer.
- c. Second Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
- d. Topcoat: Alkyd, exterior, gloss (MPI Gloss Level 6).
 - 1) Basis of Design: Sherwin Williams Pro Industrial Urethane Alkyd Enamel.

C. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System:

- a. Prime Coat: Primer, galvanized, water based.
 - 1) Basis of Design: Sherwin Williams Pro Industrial Pro-Cryl Universal Primer.
- b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
- c. Topcoat: Light industrial coating, exterior, pre-catalyzed, water based epoxy (MPI Gloss Level 5).
 - 1) Basis of Design: Sherwin Williams Pro Industrial Pre-Catalyzed Water Based Epoxy.

3.10 PAINT COLORS

A. Contractor shall match the existing color scheme present on existing exterior hollow metal doors and frames of each school consisting of the following.

- 1. Centennial Lane: Contractor shall provide at minimum (2) paint colors.
 - a. Contractor shall provide paint matching existing blue on the interior and exterior of hollow metal doors and frames.
 - b. Contractor shall provide paint matching existing color of any adjacent ancillary materials disturbed during construction requiring refinishing (gypsum, plaster, cmu etc.).
- 2. Waterloo Elementary School: Contractor shall provide at minimum (3) paint colors.
 - a. Contractor shall provide paint matching existing light blue on the exterior and interior of hollow metal doors.
 - b. Contractor shall provide paint matching existing gray on the exterior of hollow metal frames for the interior and exterior of hollow metal frames.
 - c. Contractor shall provide paint matching existing color of any adjacent ancillary materials disturbed during construction requiring refinishing (gypsum, plaster, cmu etc.).
- 3. Worthington Elementary School: Contractor shall provide at minimum (2) paint colors.
 - a. Contractor shall provide paint matching existing blue on the interior and exterior of hollow metal doors and frames.

- b. Contractor shall provide paint matching existing color of any adjacent ancillary materials disturbed during construction requiring refinishing (gypsum, plaster, cmu etc.).

END OF SECTION 099100

SECTION 122113 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Horizontal louver blinds with aluminum slats.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches long.
- D. Samples for Initial Selection: For each type and color of horizontal louver blind.
 - 1. Include Samples of accessories involving color selection.
- E. Product Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A. Subject to compliance with requirements, the following manufacturers will be among those considered acceptable:
 - 1. Hunter Douglas Architectural
 - 2. Levolor Contract
 - 3. Springs Window Fashions (SWF) Contract.
- B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.
 - 1. Width: 1 inch.
 - 2. Thickness: Not less than 0.008 inch.
 - 3. Spacing: Manufacturer's standard.
 - 4. Finish: Ionized antistatic, dust-repellent, baked polyester finish.
- C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.
 - 1. Capacity: One blind per headrail unless otherwise indicated.
 - 2. Ends: Capped or plugged.
 - 3. Manual Lift Mechanism:
 - a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range.

- b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.
 - 4. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.
 - a. Tilt: Full.
 - b. Operator: Clear-plastic wand.
 - c. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.
 - 5. Manual Lift-Operator and Tilt-Operator Lengths: Length required to extend to 48 inches above floor level when blind is fully closed.
 - 6. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard unless otherwise indicated.
 - 7. Integrated Headrail/Valance: Curved face .
- D. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.
 - 1. Type: Manufacturer's standard.
- E. Lift Cords: Manufacturer's standard braided cord.
- F. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.
 - 1. Type: Braided cord.
- G. Valance: Manufacturer's standard.
- H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
 - 1. Type: Provide mounting brackets necessary for each installation location..
 - 2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.
- I. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.
- J. Side Channels and Perimeter Light Gap Seals: Manufacturer's standard.
- K. Colors, Textures, Patterns, and Gloss:
 - 1. Slats: As selected by Architect from manufacturer's full range.
 - 2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 HORIZONTAL LOUVER BLIND FABRICATION

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.

- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Outside of Jamb Installation: Width and length necessary to cover glazed portions of hollow metal frames, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
 - 1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
- D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.
- F. Color-Coated Finish:
 - 1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Locate so exterior slat edges are not closer than 1/2 inch from interior faces of glazing frames through full operating ranges of blinds.
 - 2. Install mounting and intermediate brackets to prevent deflection of headrails.
 - 3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

- A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

- A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain systems.

END OF SECTION 122113