

PROJECT MANUAL

CONTRACT REQUIREMENTS
DIVISION 0 – DIVISION 12 SPECIFICATIONS

GMP CONSTRUCTION DOCUMENTS
FEBRUARY 2022

OWNER:
SAVANNAH – CHATHAM COUNTY PUBLIC SCHOOL SYSTEM

FOR:
C22-01 SAVANNAH ARTS ACADEMY ADDITION &
RENOVATION

PROJECT NO. CMA-1916

<p>CIVIL</p> 	<p>LANDSCAPE ARCHITECT</p> 	<p>STRUCTURAL</p> 
<p>ARCHITECTURAL</p> 	<p>MECHANICAL</p> 	<p>ELECTRICAL</p> 
<p>PLUMBING</p> 		

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DATE: March 16, 2022

PROJECT: C22-01 SAVANNAH ARTS ACADEMY ADDITION & RENOVATION
SAVANNAH-CHATHAM COUNTY PUBLIC SCHOOL SYSTEM, SAVANNAH, GA

BY: COGDELL & MENDRALA ARCHITECTS, PC (Architect)
517 East Congress Street
Savannah, GA 31401

This Addendum forms a part of the Contract Documents and modifies the original Drawings and Project Manual dated February 2022 and identified as (GMP Documents).

I. GENERAL INFORMATION:

A. Not applicable for Addendum No. 01.

II. SUBSTITUTION REQUESTS:

- A. 12 61 00 Fixed Audience Seating
1. Manufacturer: KI; Model: Lancaster
 - a. Model and manufacturer are approved

III. RFI RESPONSE:

- A. Specification calls for the Hussey "Fusion" and other specified manufacturers have chair models that closely resemble the Hussey "Classic". Please confirm which style chair you are looking for
1. Response: Hussey "Classic" is the desired chair and specification has been modified per this addendum to reflect this clarification.
- B. I looked in the specifications but did not see termite or soil treatment. My question is does Savannah Arts Academy want a 5-year termite warranty on the existing building as well as the addition or just for the addition.
1. Response: 31 31 16 Termite Control specification has been added with regard to any new work.
- C. The description of Alternate #6 for Savannah Arts Academy Addition states that the doors at Opening #500A in the Base Bid are Wood. The Door Schedule shows them as Hollow Metal. Which material is correct for the Base Bid?
1. Response: Opening is intended to be Wood. Please see revised Vol II – A8.01 for clarification.
- D. Openings 102.E and 127.2 are not scheduled with a Hardware Set and they do not occur in specified hardware sets in Division 087100. Do these openings require new hardware or is all hardware at these two openings existing to be reused?
1. Response: Door 102.E is to have hardware set 12.0. Door 127.2 is noted with remark 5, which is to replace existing glazing. Inclusion in the door schedule is specifying the type of glazing to be replaced. The door and hardware are to remain as existing. Note this glazing is changed as part of this addendum to ILG-2 instead of LG-2. Per Note 1, frame is to be modified as required to receive insulated glass.

IV. PROJECT MANUAL:

- A. Section 08 71 00 DOOR HARDWARE
 - 1. In sub-section 3.8 HARDWARE SCHEDULE add door number 102.E to hardware set 12.0
- B. Section 12 61 00 FIXED AUDIENCE SEATING
 - 1. In sub-paragraph 2.3.A.1.: Change "Hussey Seating Company Fusion™" to "Hussey Seating Company Quatro Classic."
 - 2. In sub-paragraph 2.3.A.1.a.: Change "KI Concerto Auditorium Chair" to "KI Lancaster"
 - 3. In sub-paragraph 2.3.I.1: Change "Self-Rising Seat Mechanism: Torsion Springs, full fold." to "Self-Rising Seat Mechanism: Torsion Springs, full fold or gravity lift seat return to full-fold position."
- C. Section 26 60 11 EMERGENCY POWER SYSTEM – NATURAL GAS
 - 1. Replace this specification in its entirety
- D. Section 27 41 16 INTEGRATED AUDIO-VIDEO COMMUNICATIONS & THEATER EQUIPMENT
 - 1. Replace this specification in its entirety
- E. Section 31 31 16 TERMITE CONTROL
 - 1. Add this specification in its entirety

V. Drawings:

- A. Vol I - RENOVATION:
 - 1. General:
 - a. T1.0 – Volume I Title Sheet
 - 2. Architectural:
 - a. A8.01 – DOOR SCHEDULE & ELEVATIONS: Replace this sheet entirely.
 - 3. Plumbing:
 - a. P1.04 – PLUMBING PLAN – MECHANICAL ROOM: Replace this sheet entirely.
 - 4. Mechanical:
 - a. M1.25 – MECHANICAL PLAN – MECHANICAL ROOM: Replace this sheet entirely.
 - 5. Electrical:
 - a. E2.04 – POWER PLAN – MECHANICAL ROOM: Replace this sheet entirely.
 - b. E3.04 – FIRE ALARM PLAN – MECHANICAL ROOM: Replace this sheet entirely.
 - 6. Lighting:
 - a. L2.04 – LIGHTING PLAN – MECHANICAL ROOM: Replace this sheet entirely.
 - 7. EPS:
 - a. EPS-1.2 – 1ST FLOOR ACOUSTIC SYSTEM PLAN: Replace this sheet entirely.
 - b. EPS-2.5 – CURTAIN LAYOUT: Replace this sheet entirely.
 - c. EPS-3.1 – AUDITORIUM SECTION: Replace this sheet entirely.
 - 8. PS:
 - a. PS-1.1 – AUDIO FLOW DIAGRAM: This sheet added as part of this addendum
 - b. PS-1.2 – AUDIO FLOW DIAGRAM (CONT.): This sheet added as part of this addendum
 - c. PS-1.3 – AUDIO FLOW DIAGRAM (CONT.): This sheet added as part of this addendum
 - d. PS-1.4 – AUDIO FLOW DIAGRAM (CONT.): This sheet added as part of this addendum
 - e. PS-1.5 – VIDEO FLOW DIAGRAM: This sheet added as part of this addendum
 - f. PS-1.6 – CONTROL FLOW DIAGRAM: This sheet added as part of this addendum
 - g. PS-1.7 – LIGHTING FLOW DIAGRAM: This sheet added as part of this addendum
 - h. PS-1.8 – POWER FLOW DIAGRAM: This sheet added as part of this addendum
- B. Vol II - ADDITION:
 - 1. Civil:
 - a. C2.0 – PROPOSED SITE LAYOUT: Replace this sheet entirely.
 - b. C2.1 – FIRE ACCESS PLAN: Replace this sheet entirely.
 - c. C3.0 – INITIAL SOIL EROSION CONTROL PLAN: Replace this sheet entirely.
 - d. C3.1 – INTERMEDIATE SOIL EROSION CONTROL PLAN: Replace this sheet entirely.

- e. C3.2 – FINAL SOIL EROSION CONTROL PLAN: Replace this sheet entirely.
- f. C4.1 – GRADING PLAN – B: Replace this sheet entirely.
- 2. Structural:
 - a. S1.01 – FOUNDATION SECTIONS: Replace this sheet entirely.
- 3. Architectural:
 - a. A4.03 – ENLARGED PARTIAL FLOOR PLANS: Replace this sheet entirely.
 - b. A8.01 – DOOR SCHEDULE, DOOR TYPES, & HM FRAME ELEVATIONS: Replace this sheet entirely.
- 4. Fire Protection:
 - a. FC1.01 – FIRE PROTECTION PLAN – CAFETERIA ADDITION: Replace this sheet entirely.
- 5. Electrical:
 - a. EC2.01 – POWER PLAN – CAFETERIA ADDITION: Replace this sheet entirely.

END OF ADDENDUM No. 01

ADDENDUM No. 02

DATE: March 21, 2022

PROJECT: C22-01 SAVANNAH ARTS ACADEMY ADDITION & RENOVATION
SAVANNAH-CHATHAM COUNTY PUBLIC SCHOOL SYSTEM, SAVANNAH, GA

BY: COGDELL & MENDRALA ARCHITECTS, PC (Architect)
517 East Congress Street
Savannah, GA 31401

This Addendum forms a part of the Contract Documents and modifies the original Drawings and Project Manual dated February 2022 and identified as (GMP Documents).

I. GENERAL INFORMATION:

A. Not applicable for Addendum No. 02.

II. SUBSTITUTION REQUESTS:

A. Not applicable for Addendum No. 02.

III. RFI RESPONSE:

A. Not applicable for Addendum No. 02.

IV. PROJECT MANUAL:

A. Not applicable for Addendum No. 02.

V. Drawings:

A. Vol I - RENOVATION:

1. Mechanical:

a. M1.25 – MECHANICAL PLAN – MECHANICAL ROOM: Replace this sheet entirely.

END OF ADDENDUM No. 02

ADDENDUM No. 03

DATE: March 23, 2022

PROJECT: C22-01 SAVANNAH ARTS ACADEMY ADDITION & RENOVATION
SAVANNAH-CHATHAM COUNTY PUBLIC SCHOOL SYSTEM, SAVANNAH, GA

BY: COGDELL & MENDRALA ARCHITECTS, PC (Architect)
517 East Congress Street
Savannah, GA 31401

This Addendum forms a part of the Contract Documents and modifies the original Drawings and Project Manual dated February 2022 and identified as (GMP Documents).

I. GENERAL INFORMATION:

A. Not applicable for Addendum No. 03.

II. SUBSTITUTION REQUESTS:

A. 07 54 19 POLYVINYL-CHLORIDE (PVC) ROOFING:

1. Manufacturer: Soprema Product: Sentinel P150 HFB 60 Mil Fleece-Backed PVC Roof System
 - a. Model and manufacturer are denied.

III. RFI RESPONSE:

A. The mechanical equipment schedule on sheet E6.01 doesn't show any disconnects for the ATUs furnished by division 26 or 23. Note 2 on sheets E2.01, E2.02 & E2.03 says "Provide new disconnect switch and final connection to unit in accordance with the mechanical equipment connection schedule." Please clarify that the ATUs will be furnished with a disconnect by the manufacturer. There are 138 listed on sheet MO.02.

1. Response: All ATUs will have disconnects by Division 23.

B. On sheets L0.01 through L2.04, there is a note that states that all work associated with this sheet is by separate contractor as part of Georgia Power contract. Please verify that nothing on these sheets will be included in our bid.

1. Response: All work associated with the "L" series of sheets are part of a separate contract with Georgia Power. This includes the demolition and installation of new light fixtures and lighting controls. It is only included in the drawing set for coordination purposes.

C. The plumbing drawing do not indicate new gas regulators at the generator or two boilers. Are they required?

1. Response: Please see revised P1.04 PLUMBING PLAN – MECHANICAL ROOM for regulator replacement revisions.

D. Also, the Grease traps will be provided by the site contractor.

1. Response: Design team does not advise as to how subcontractor packages are divided. Please coordinate with GC to ensure appropriate scope.

E. Looks like there is some stage work in the specs but not in the drawings. In the finish schedule it has some resilient flooring & wood flooring. If you could help clear up exactly what they are looking for we would love to get you a quote.

1. Response: Summary of the work regarding 09 64 00 WOOD STAGE FLOORING is included as part of the section summary and has been included for patching (as necessary) of existing solid wood flooring, stage apron, existing base, and stairs to stage from auditorium floor. Damaged areas shall be replaced per specifications. Resinous Dance Flooring is specified under 09 65 00

- RESILIENT TILE FLOORING, WALL BASE AND ACCESSORIES and is designated as "RDF" and is to be installed in the Dance Rooms per the finish schedule.
- F. Savannah Arts Academy for McKnight, there's 3 Transom Frames (see attached) that CECO cannot provide to meet hurricane codes. Can you contact McKnight ask them if the architect is willing to redesign these openings, if they should be changed to Aluminum, or if we should include them as HM as shown excluding any hurricane rating?
1. Response: The three frames have been changed to be a curtainwall system. Please find a specification 08 44 13 GLAZED ALUMINUM CURTAIN WALL and details on A8.01 & A8.02 modified to reflect this change.
- G. Are any breakouts required on the Proposal? Specifically, Addition vs. Renovation breakout.
1. Contractor's Response: No breakouts required.
- H. Will there be any Asbestos Abatement required?
1. Response: The existing facility was renovated in 2004, and it is understood that abatement of the facility was part of the scope of the previous project. If any concealed potentially hazardous materials are encountered, the architect is to be notified prior to proceeding further with work per the Demolition drawings.
- I. What are the specified HVAC controls?
1. Contractor's Response: ALC is the current controls at SAA.
- J. Will Crane Lifts be allowed to take place while the school is Occupied?
1. Contractors Response: No. Crane Lifts are not allowed while the school is occupied.
- K. When will the work in Auditorium commence?
1. Contractor's Response: Work in the Auditorium will take place immediately once materials are received.
- L. Will there be lay down space?
1. Contractor's Response: There will be minimal lay down space on site. Store materials and deliver as needed.

IV. PROJECT MANUAL:

- A. Section 08 44 13 GLAZED ALUMINUM CURTAIN WALLS
1. Add this section in its entirety

V. Drawings:

- A. Vol I - RENOVATION:
1. Architectural:
 - a. A8.01 – DOOR SCHEDULE & ELEVATIONS: Replace this sheet entirely.
 - b. A8.02 – STOREFRONT, HOLLOW METAL, AND EXTERIOR DETAILS: Replace this sheet entirely
 2. Plumbing:
 - a. P1.04 – PLUMBING PLAN – MECHANICAL ROOM: Replace this sheet entirely.

END OF ADDENDUM No. 03

ADDENDUM No. 04

DATE: March 24, 2022

PROJECT: C22-01 SAVANNAH ARTS ACADEMY ADDITION & RENOVATION
SAVANNAH-CHATHAM COUNTY PUBLIC SCHOOL SYSTEM, SAVANNAH, GA

BY: COGDELL & MENDRALA ARCHITECTS, PC (Architect)
517 East Congress Street
Savannah, GA 31401

This Addendum forms a part of the Contract Documents and modifies the original Drawings and Project Manual dated February 2022 and identified as (GMP Documents).

I. GENERAL INFORMATION:

A. Not applicable for Addendum No. 04.

II. SUBSTITUTION REQUESTS:

A. Not applicable for Addendum No. 04.

III. RFI RESPONSE:

A. AWP-1B wall Panel Type: Calls for these "Foundations Panels" to be on Classroom Walls. I don't see any on the drawings. Can you clarify or identify where they are?

1. Response: AWP-1B is not used

B. AWP-2A and 2B are called out as "Foundations", but they have a fabric facing. Foundations is a field paintable panel. These should either be standard A200 panels (2" Thick Standard) or IR 208 High Impact (2-1/8" Thick) Panels. Please correct.

1. Response: See Project Manual modifications per this addendum.

C. A5.03 shows Theater Side Walls. There is a callout for AWP-2C for some of the panels, but there is not an AWP-2C type in the specs. I think this may be AWP-2B, but please advise and clarify or correct as needed. See attached A5.03 Sheet with comments

1. Response: See Revised A5.03 per this addendum.

D. The Autex Baffles, if used in a rectangular shape are called Frontier "Tundra" baffles (not "Lattice"). Needs correction in the spec.

1. Response: See Project Manual modifications per this addendum.

E. Spec calls for "integrating light fixtures", which Autex does not do. If the lights are between the baffles, no problem. Need to clarify this.

1. Response: See Project Manual modifications per this addendum.

F. What is the thickness of the baffles? Typical thickness is either 1/2" or 1".

1. Response: Baffles are 1" Thick

G. What is the thickness of the baffles? Typical thickness is either 1/2" or 1"

1. Response: Baffles are 18" in Height (Vertical Depth).

IV. PROJECT MANUAL:

A. Section 09 51 13 ACOUSTICAL PANEL CEILINGS AND CLOUDS

1. In sub-paragraph 2.10.A.1.: Change 'Lattice' to 'Frontier "Tundra."'

2. In sub-paragraph 2.10.A.6.: Change 'integrating light fixtures' to 'coordinate with light fixtures hung between baffles.'

B. Section 09 84 33 SOUND AFFECTING WALL AND CEILING UNITS

1. In sub-paragraph 2.2.C.1.: Change 'Foundations Direct Attach Ceiling Panels' to 'A200.'

V. Drawings:

A. Vol I - RENOVATION:

1. Architectural:

- a. A5.03 – INTERIOR ELEVATIONS - AUDITORIUM: Replace this sheet entirely.

B. Vol II - ADDITION:

1. Electrical:

- a. EC0.02 – LIGHTING FIXTURE SCHEDULE & DETAILS: Replace this sheet entirely.

END OF ADDENDUM No. 04

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- Subcontractor Early Retainage Release Certificate
- Affidavit, Interim Waiver and Conditional Release of Liens and Claims
- Subcontractor Affidavit, Interim Waiver and Conditional Release of Liens and Claims
- Affidavit, Final Waiver and Release of Liens and Claims
- Subcontractor Affidavit, Final Waiver and Release of Liens and Claims

EXHIBITS

- Exhibit A. Project Pre-Design Study or Program Information
- Exhibit B. Initial Construction Cost Estimates
- Exhibit C. CMR's Fee Proposal
- Exhibit D. Schedule
- Exhibit E. Not Used
- Exhibit F. Specimen GMP Change Order
- Exhibit G. Specimen Construction Documents Change Order
- Exhibit H. Not Used
- Exhibit I. Application for Payment
- Exhibit J. Final Certification of Costs for Accounting
- Exhibit K. Staffing Plan, Wage and Salary Schedule

Exhibit L. Material Completion Checklist
Exhibit M. Certificate of Manufacturer (Instructions)
Exhibit N. Five Year Bond on Roofs and Walls
Exhibit O. Bond to Discharge Claim
Exhibit P. Design Professional's Certificate of Material Completion
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Exhibit S. Request for Reimbursement DE Form 0263

SUPPLEMENTARY GENERAL REQUIREMENTS

GENERAL REQUIREMENTS OF THE CONSTRUCTION MANAGEMENT-AT-RISK CONTRACT

SECTION 1 – GENERAL PART 1 – GENERAL PROVISIONS

1.1.1 General Matters.

1.1.1.1 This Contract and Affiliated Agreements – Requirement for Written Agreements. Affiliated Agreements are any agreement required by this Contract or deemed necessary, efficient, or expedient by CMR, between the CMR and any party other than the Owner. All Affiliated Agreements, including any subsequent modifications, must be in writing, dated, and executed by the parties. Affiliated Agreements, including financial arrangements with respect to this Project, must be provided within 14 days and fully disclosed to the Owner upon their execution or modification. The Affiliated Agreements shall be executed in conformance with the requirements in Section 3, Part 7.

1.1.1.2 Basic Statement of Owner Objectives. The Owner's basic objectives are to develop Construction Documents based on the Documents listed in Exhibit A incorporated herein by reference so as to permit construction of the Project within the limits of the funds available to Board for construction of the Project as established by the Board (but in no event in excess of the Stated Cost Limitation (GMP Cost Limitation) set forth in Paragraph 4 of the Contract above) and to construct the Project in accordance with the approved Construction Documents. The basic tenets of this Contract, which shall form the basis of interpretation of this Contract, are set forth in the Preface and incorporated by reference herein.

1.1.1.3 Project Team. To accomplish Owner's objectives, Owner intends to employ a team concept in connection with the development of Construction Documents and construction of the Project. The basic roles and general responsibilities of team members are set forth in general terms below but are more fully set forth in the Architectural Contract with respect to the Design Professional, in the Program Management contract with any Program Manager, and in this Contract with respect to the CMR.

1.1.1.3.1 Relationship of Parties. The Owner and the CMR agree to proceed with the Project on the basis of trust, good faith, and fair dealing, to cooperate fully with each other and shall do all things reasonably necessary to perform this Contract in an economical and timely manner, including without limitation, consideration of design modifications and alternative materials or equipment, if considered necessary or convenient by the Owner. The CMR agrees to procure or furnish, as permitted by the laws of Georgia, all preconstruction phase services and construction phase services as set forth herein. The Owner shall endeavor to promote harmony and cooperation among the Owner, Program Manager, Design Professional, CMR and other persons or entities employed by the Board for the Project.

1.1.1.3.2 Design Professional. The Design Professional is retained in accordance with the Architectural Contract (i) for the design and preparation of Construction Documents that are necessary to implement the Program governing the construction of the Project or Components thereof, and the design and preparation of any necessary documents antecedent to preparation of such Construction Documents, or (ii) for supervision or architectural administration of the Work under Contract Documents, or (iii) for both. The term "*Design Professional*" includes engineers, surveyors, designers and the other consultants retained by the Design Professional. The CMR acknowledges and agrees that the Contract Documents are addressed to skilled tradesmen in the construction profession who shall be required to use their special skills and experience, through submittals and shop drawings, to translate the Design Professional's design intent as expressed in the Contract Documents into a completed structure. The Contract Documents shall specify when shop drawings or submittals require the seal of a specialty consultant.

1.1.1.3.2.1 The basis of the Owner's engagement of the Design Professional is the "Design Professional Contract." The CMR acknowledges that both the Owner and the Design Professional have on file, at their respective places of business, copies of that executed agreement, and that both the Owner and the Design Professional will make available for

review by CMR those copies at the CMR's request. The Design Professional is not the agent of the Board, except to the extent so specified in writing, but is employed as a consultant to the Board to assist the Board in determining if the conditions of the contract have been met.

1.1.1.3.2.2 The CMR may request and review a copy of the Design Professional Contract prior to the commencement of preconstruction services so that it may become familiar with the respective services, authorities, obligations, and responsibilities of the parties therein. CMR agrees to coordinate, assist, and develop a working relationship with the Design Professional to effect the purposes of the Project in accordance with the terms of this Contract and the Architectural Contract.

1.1.1.3.2.3 The CMR also acknowledges that the Design Professional will consult with and assist the Board in developing and implementing the Board's objectives, including budgeting and time criteria, space requirements and relationships, flexibility and expandability requirements, special equipment and systems, and site requirements. Furthermore, the CMR acknowledges that the Board and the Design Professional are proceeding with the Project on the basis of trust, good faith, and fair dealing, and they will take all actions reasonably necessary to ensure the Project proceeds to completion within the Board's time and budgeting constraints. The CMR further acknowledges that in order for the Design Professional to perform its obligations under the Design Professional Contract, the Design Professional requires certain materials, information or other submissions as per the Contract Documents, from the CMR. The CMR agrees to provide the Design Professional with the submittals required by the Construction Documents. The CMR further agrees to cooperate with the Design Professional to ensure timely completion of all obligations under this Contract and the entire Project.

1.1.1.3.2.4 CMR agrees that the services provided by the Design Professional under the Architectural Contract are intended to coordinate and complement, but not to diminish, alter or substitute for any of the services, authority, obligations, or responsibilities of the CMR under this Contract. CMR further agrees that the performance of services by the Design Professional in connection with the Project shall in no way relieve CMR from any of its services, authority, obligations, or responsibilities under this Contract, and shall not alter or diminish those services, authority, obligations, or responsibilities in any way whatsoever.

1.1.1.3.3 Owner/Board's Representative. Board shall from time to time in writing designate one person as Board's Representative under this Contract. Board may designate a Program Manager, if any, as the Board's Representative. Board's Representative so designated in writing shall serve as Board's Representative under this Contract unless or until Board gives notice in writing of the appointment of his successor. Board or Board's Representative may designate in writing assistants to serve as Board's Representative with respect to the Project governed by this Contract or in different phases or in specific areas of responsibility with respect to the Project. All requests for consents and approvals required of Board in connection with the Project, whether by Design Professional, Program Manager, or CMR, shall be submitted to Board's Representative, or if the matter is within the written designation of authority of his assistant, to his designated assistant. It is expressly understood that no changes may be made to any contract for construction services which result in a net increase or decrease to the dollar value of the original contract awarded to provide such services without the approval of the Superintendent or the School Board as required by Board Policy FGG.

1.1.1.3.4 Program Manager. Board may designate a Program Manager to administer the Project and this Contract. In lieu of a Program Manager, Design Professional may be designated to perform the role of Program Manager. The Program Manager may also be designated as the Owner's Representative, and if no Owner's Representative is designated, the Program Manager shall be the Owner's Representative.

1.1.1.3.5 CMR. In accordance with this Contract, the CMR shall participate in the review and development of the design of the Project set forth in the Program and, in coordination with the Design Professional, shall participate in the scheduling of such design work and of construction of the Project, including Components thereof, construction of the Components of the Project under Construction Orders, and of the entire Project under a GMP Change Order. Nothing herein shall be deemed to impose upon the CMR any responsibilities to provide any services constituting the practice of architecture, engineering, or any related design profession. CMR shall exercise the professional skill and judgment of a CMR in similar circumstances in the performance of its construction management services.

1.1.1.3.6 Board's Construction Inspector. From time to time, in writing, the Board may designate an individual or firm as Board's Construction Inspector under this Contract. The Board's Construction Inspector may be hired by Board or hired under the Design Professional's contract and shall provide up to 100% inspection services of the Work on behalf of the Board. The presence of a Board's Construction Inspector does not relieve the CMR of any of its responsibilities for quality control and independent testing set forth in the General Requirements. The Board's Construction Inspector has the authority to report any deviations from the contract documents directly to the CMR's superintendent at the job site for immediate action, and also to report same to the Design Professional and Board.

1.1.1.3.7 Owner's Contract Compliance Specialist (CCS). From time to time, in writing, the Owner may designate an individual or firm as Owner's Contract Compliance Specialist under this Contract. The Owner's Contract Compliance Specialist may be hired by Owner or hired under the Program Manager's or Design Professional's contract and shall provide general review and observations of the work on behalf of the Owner. The presence of an Owner's Contract Compliance Specialist does not relieve the CMR of any of its responsibilities for quality control and independent testing set forth in the General Requirements. The Owner's Contract Compliance Specialist has the authority to report any deviations from the contract documents directly to the CMR's project manager or superintendent at the job site for immediate action, and also to report same to the Program Manager or Design Professional, and Owner.

1.1.1.3.8 Representatives. Except as provided elsewhere in this Contract or in a Board Policy, the designated representatives of the CMR and the Board (subject to Georgia Law and legislation applicable to the Board) shall have full authority to act (other than for the receipt of notices that must be given as specified in Section 1.1.5) in matters relating to this Contract until notice is given that such authority has been revoked. CMR and the Board may each rely upon the written certification of the other as to the appointment of a designated representative or the revocation of his authority. The CMR shall designate, in writing, a representative authorized to act on the CMR's behalf with respect to the Project. The CMR's initial authorized representative shall be the Program Manager identified in the CMR's proposal. CMR shall employ the Project Superintendent and necessary assistants who shall be in attendance at the Site during the progress of the Work. The Project Superintendent shall represent the CMR: All written communications given to the Project Superintendent on site shall be deemed to have been delivered to the CMR.

1.1.1.3.9 Separate Contractors. Board may select one or more Separate Contractors to perform work with respect to the Project or Components thereof. The CMR shall afford the Board's Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall coordinate the Separate Contractors' schedules with those of the CMR. The Board's Separate Contractors shall adhere to the CMR's work rules, schedule, laydown areas, and safety requirements.

1.1.1.3.10 Commissioning Authority. Board may select and employ a Commissioning Authority to perform building commissioning activities and monitor testing activities.

1.1.2 Project Team, Cooperation, Partnering.

1.1.2.1 Concept. It is the Board's expectation that the Design Professional, Board, SCCPSS, CMR, and any Separate Contractor, shall work as a Project Team to effect the commencement of and completion of construction in accordance with the Project Schedule, and to achieve Material Completion and Final Completion of the Project within the time frames designated. Each team member shall communicate with all other team members to assure overall coordination, cooperation, and efficiency. Each team member shall cooperate fully with and coordinate fully with each other team member in order to achieve Project completion in an expeditious and economical manner. The CMR shall schedule regular meetings of the key principals of the Project Team in an effort to solve problems in a partnering atmosphere to facilitate the ability of each team member to meet its business objectives, so long as its business objectives are consistent with the successful completion of the Project. It is the Board's intent that all consensus decisions of the Project Team, where differing from the Contract Documents, be memorialized in writing.

1.1.2.2 Conference. Promptly after the execution of this Contract, CMR shall confer with the Program Manager, Design Professional, Board, and to identify personnel and relevant organizational charts of each team member, and to establish working relationships with each team member.

1.1.2.3 Authority of CMR. CMR is, and at all times during the term of this Contract shall be, an independent CMR in the performance of its duties and obligations under this Contract. CMR shall have no authority to bind or otherwise obligate Board, orally, in writing or by any acts, unless specifically authorized by Board in writing. Nothing contained in this Contract shall constitute or be deemed or construed to create a partnership or joint venture, or any agency relationship, between Board and CMR.

1.1.2.4 Team Evaluation Process, Covenant not to Sue. If Team Evaluation is elected as part of this Contract, all team members agree to participate in good faith in the Team Evaluation Process. By executing this agreement for construction services with the Board, the CMR waives any and all legal rights for defamation, libel or slander and covenants not to sue the Board, the Design Professional, the other team members, and their respective representatives and agents for comments, rankings, and results related to the CMR's performance posted in good faith as a part of, and in accordance with, said Team Evaluation Process. The Design Professional and other team members, in their agreements with the Board, have executed, or will execute, a similar agreement

1.1.3 **Constitutional Principles Applicable to Public Works Projects.**

1.1.3.1 Title to Project Site. Title to the Site is vested in the Board of Public Education for the City of Savannah and County of Chatham, as public property of the Board and is not subject to levy or lien.

1.1.3.2 Title to Improvements and Delivered Materials. Title to all improvements constructed at the Site vests *instantly* to the Board of Public Education for the City of Savannah and County of Chatham. Title to all materials vests to the Board of Public Education for the City of Savannah and County of Chatham upon their delivery without rejection by the CMR at the Site, regardless of the status of payment or nonpayment of the costs thereto. Protection of laborers and Suppliers (regarding payment for services and materials) is effected through the provision of payment and performance bonds.

1.1.3.3 Limited Waiver of Sovereign Immunity *Ex Contractu*. CMR acknowledges and agrees that Board is a political subdivision of the State of Georgia, and as such is entitled to the protection of sovereign immunity. As set forth in Article I, Section II, Paragraph IX of the 1983 Georgia Constitution, sovereign immunity is waived "as to any action *ex contractu* for the breach of any written contract." CMR specifically acknowledges the constitutional and contractual requirements that written changes, modifications, and waivers to this Contract must be specifically executed by the Board as set forth in the Contract Documents. Accordingly, CMR specifically acknowledges the constitutional prohibitions against claims against Board based solely upon oral statement, course of conduct, customs of the trade, quasi-contract, *quantum meruit*, or O.C.G.A § 13-4-4 (mutual departure from contract terms).

1.1.3.4 Limitations upon Authority of Agents. CMR further acknowledges that Board is a body politic and a political subdivision of the State of Georgia, and as such acts through specific public officials. CMR specifically acknowledges the statutory and contractual requirements that written changes, modifications, and waivers to this contract must be executed only by the identified representatives of Board as set forth in the Contract Documents. Accordingly, CMR specifically acknowledges that any claims against Board based upon the act of any non-authorized employee or official are invalid.

1.1.3.5 U.C.C. Not Generally Applicable. CMR further acknowledges and agrees that Board, as set forth in subsection (3) above, has granted only a limited waiver of sovereign immunity, such that the provisions of the Uniform Commercial Code (O.C.G.A §11-1-101 through §11-2-725) governing sales of goods do not apply to this Contract. CMR specifically acknowledges the contractual requirements that written changes, modifications, and waivers to this contract must be specifically executed by the Board as set forth in the Contract Documents. Accordingly, CMR specifically waives and covenants not to make against Board any claims based upon the Uniform Commercial Code. CMR understands, however, that CMR's subcontracts with Suppliers and Subcontractors may in fact include sales of goods and therefore be properly governed by the Uniform Commercial Code; nonetheless CMR covenants that any such application shall in no way be construed to have any legal effect upon this contract between Board and CMR.

1.1.4 Third Party Beneficiary. CMR acknowledges, stipulates, and agrees that the Board is a political subdivision of the State of Georgia performing an essential public and governmental function by means of the Contract. CMR acknowledges, stipulates, and agrees that SCCPSS is an express third party beneficiary of this Contract. There are no individual or personal third party beneficiaries of this Contract.

1.1.5 Notice.

1.1.5.1 General Requirement. Any notice, election, demand, request, consent, approval, or other communication required or permitted to be given under this Contract shall be in writing signed by an officer or duly authorized representative of the party making same and shall be delivered personally or shall be sent by certified or statutory mail, postage prepaid, return receipt requested, shall be effective as of the date on which it is received or would have been received but for the refusal of the addressee to accept delivery, and shall be addressed as shown in the Contract. The persons and addresses to which notices should be given may be changed by notice given in accordance with this Article.

1.1.5.2 Copies of Notices to Board. Wherever the Contract Documents provide that a copy of any notice, request, or demand filed with the Design Professional by the CMR shall be furnished to the Board, such notice, request, or demand shall not become effective until the Board has received its copy. No notice in writing or given orally to the Design Professional or to the Program Manager is notice to the Board unless copy of the aforesaid notice in writing shall have been properly served upon the Board at the address shown in the Contract.

1.1.6 Liquidated Damages.

1.1.6.1 Time of the Essence. Time being of the essence of this Contract, and a material consideration thereof, it is mutually agreed by the parties hereto in case of the CMR's failure to complete the construction within the time specified, the Board will be damaged thereby. The CMR shall commence performance of its activities on the Site under this Contract within two business days of the date specified in the Proceed Order. The CMR shall complete construction, except for Minor Items and Permitted Incomplete Work (see Article 6.1.1), not later than the Material Completion and Occupancy Date, as adjusted by Change Order.

1.1.6.2 Liquidated Damages. Because it is difficult to definitely ascertain and prove the amount of said damages, inclusive of, but not limited to, expenses for inspection, superintendence, loss of use, and necessary traveling expenses, the Board, and CMR hereby agree that the amount of such damages shall be the daily rate specified in the Contract, beginning upon the contractually required Material Completion Date and ending on the date that the Certificate of Material Completion is

issued. The parties agree that the specified Liquidated Damages are not established as a penalty but are calculated and agreed upon in advance as a fair and equitable amount reasonably estimated in advance to cover losses to be incurred by the Board for such delay or interruption in view of the uncertainty and impossibility of ascertaining actual damages that would be incurred.

1.1.6.2.1 CMR Agrees to Pay. The CMR agrees to pay the amount, computed by multiplying the Liquidated Damages set forth in the Contract by the number of days between the contractually required Material Completion Date and the date that the Certificate of Material Completion is issued.

1.1.6.2.2 Deducted as They Accrue. Liquidated Damages shall be deducted from periodic payments as they accrue and such deduction shall be in addition to the retainage provided for in the Contract. The remaining balance of any Liquidated Damages shall be deducted from the Payment for Material Completion to the CMR or its Surety. If the unpaid balance of the Contract Sum is less than the total amount to be deducted for Liquidated Damages as herein above provided, the CMR shall promptly pay to the Board, upon the Board's demand, the amount by which such sum exceeds the unpaid balance of the Contract Sum.

1.1.6.3 Limitation on Board's Damages. Except as otherwise set forth in the Contract Documents, damages of the Board and for delay shall be limited to the Liquidated Damages as defined herein. Nothing in this Article shall be construed to limit Board's right to pursue damages or other remedies for claims against the CMR for reasons other than delay.

1.1.7 Documents.

1.1.7.1 Precedence of Documents and Changes. In the event of conflict, the Contract takes precedence over the Supplementary Requirements, and the Supplementary Requirements take precedence over the General Requirements. No change to the Contract Documents is effective unless notice shall have been issued by the Board bearing the imprimatur of the Board as follows:

“By order of The Board of Public Education for the City of Savannah and the County of Chatham.”

The Design Professional has no authority to amend the Contract Documents, orally or in writing, either expressly or by implication. The Contract Documents are to be taken as a whole and are intended to be complementary with one another. It is also intended that they include all items necessary for the proper execution and completion of the Work. If a conflict exists between or within the Contract Documents, or if they are inconsistent, the provisions of any Change Order added hereto after the date of this Contract shall control over any contrary terms contained in the Contract Documents existing at the time of this Contract. This Contract shall govern in the event of any conflict with any other provisions of the contract documents unless notice to the contrary shall have been issued by the Board. In the case where there is a conflict or inconsistency and a change order has not been issued and this Contract does not resolve the conflict or inconsistency, the contract document having the more stringent code or performance requirements shall govern

1.1.7.2 Copies of Contract Documents to CMR. Without charge to the CMR the Design Professional shall furnish to the CMR in hardcopy, one set of reproducible and electronic background floor and reflected ceiling plan drawings and, if requested, one copy in read-only electronic format. The CMR may obtain such additional sets of Contract Documents, as the CMR deems necessary and shall pay the cost of reproduction of such additional sets to the Design Professional.

1.1.7.3 Marked-Up (“As-Built”) Documents. Prior to Material Completion, the CMR shall provide one complete set of Marked-Up Documents to the Design Professional. The Marked-Up Documents shall consist of the Contract Documents annotated and changed to reflect the as-built condition of the Project, including all Change Orders, ASIs, field instructions, RFI Responses as defined in Article 2.2.1.6, clarifications, sketches, delegated CMR design drawings and locations of utilities and other hidden elements.

1.1.7.4 Copies to the Board. Upon Board’s request, the CMR shall furnish the Board with copies of Project related correspondence, letters of transmittal, and other relevant material.

1.1.8. Defined Terms. Wherever used in the Contract Documents, the terms defined in this Contract will have the meanings indicated that are applicable to both the singular and plural, and to the masculine and feminine thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents may include references to identified articles and paragraphs, and the titles of other documents or forms.

1.1.8.1 Meaning of Words and Phrases. Unless the context or the Contract Documents taken as a whole indicate to the contrary, words used in the Contract Documents that have usual and common meanings shall be given their usual and common meanings; words having technical or trade meanings shall be given their customary meaning in the subject business, trade, or profession. Materials or work described in words that, so applied, have a well-known technical or trade meaning shall be held to refer to such recognized meaning.

1.1.8.2 Cross-References, Headings, and Citations to the Contract. Cross-references, headings, and citations to the Contract, if any, are for the convenience of the CMR and the Board and are not intended to be plenary or exhaustive nor are they to be considered in interpreting the Contract Documents or any part of the Contract Documents.

1.1.8.3 Install, Deliver, Furnish, Supply, Provide and Other Such Words. Install, deliver, furnish, supply, provide, and other such words mean that the Work in question shall be put in place by the CMR ready for use unless expressly provided to the contrary.

1.1.8.4 Articles Not Plenary. This Article and Article 1.1.9 are not entire, plenary, or exhaustive of all terms used in the Contract and General Conditions that require definition. There may be definitions of other terms under articles to which the terms are related. Terms defined in the Design Professional Contract and any Program Management Contract shall have the meanings set forth in those documents.

1.1.9 Basic Definitions.

Some of the definitions below include information beyond merely definitions, all of which requires the full compliance of the CMR.

1.1.9.1 *Addenda*. Written or graphic instruments issued by the Design Professional prior to the establishment of a Construction Order amount or GMP to which the addendum pertains, which clarify, correct, or change any of the component parts of the Contract Documents.

1.1.9.2 *Affiliate*. With respect to CMR, any firm, partnership, corporation or other legal entity that is owned by, under common Board ship or control with, or having a common principal or shareholder with, the CMR, whether such relationship is direct or indirect. In addition, unless the consequences of such relationship for the purposes of this Contract are expressly waived in writing by the Board after full disclosure by the CMR, the term “Affiliate” also includes any entity currently affiliated with CMR as a partner or joint venturer with respect to any commercial venture, whether or not such venture includes the Project. See O.C.G.A. §13-10-23.

1.1.9.3 *Affiliated Contract*. Any agreement concerning the Project between the CMR and an Affiliate, including all modifications and amendments thereto.

1.1.9.4 *Application for Payment.* The form acceptable to Board that is to be used by the CMR during the course of the Work in requesting payment from the Board and that is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.1.9.5 *Asbestos.* Any material that contains more than one percent (1%) asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

1.1.9.6 *Authorization for SCCPSS to Enter.* The Notice from Board to the CMR and the SCCPSS, upon issuance of a Certificate of Material Completion, that the SCCPSS is authorized to take possession of the Project.

1.1.9.7 *Basic Services.* The preconstruction, consultation, construction and related services required to be provided by the CMR for the construction and completion of the Project or Component thereof in accordance with the Contract Documents. Basic Services does not include the term "Work."

1.1.9.8 *Bulletin* Written or graphic material issued after the award of the contract that clarifies, corrects, or proposes a change in any of the component parts of the Contract Documents.

1.1.9.9 *Business Day.* A business day is each calendar day other than Saturday, Sunday, and any holiday observed by Board .

1.1.9.10 *Calendar Day.* A calendar day is each twenty-four (24) hour day including Saturday, Sunday and any holiday.

1.1.9.11 *Change Orders.* A document issued on or after the Effective Date of the Contract, signed by the CMR and the Board and ordinarily certified by the Design Professional, which may authorize a change or changes, including but not limited to a change to the Contract Sum, the Contract Time, or the Contract Documents. These types of Change Orders (See Section 3 Part 4) provide a separate specified allowance for Overhead and Profit and are not subject to CMR Construction Fee, Overhead and Expenses. In addition to typical Change Orders, certain special change orders, including but not limited to, Construction Orders, Construction Document Change Orders, Guaranteed Maximum Price Change Orders, and Construction Contingency Change Orders, may be issued under this Contract.

1.1.9.12 *Claim.* A demand or assertion by the Board or the CMR seeking an adjustment of the Contract Sum or Contract Time, or both, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Board and the CMR arising out of or relating to the Contract. The responsibility to substantiate a Claim shall rest with the party making the Claim. A demand for money or services by a third party, including a Trade CMR, Supplier, or subcontractor to the CMR, is ipso facto not a Claim against the Board .

1.1.9.13 *Component.* An element of a Project for which the Design Professional agrees to prepare or segregate Construction Documents as a discrete package to permit procurement of the described items or the commencement of the construction of the described element of the Project.

1.1.9.14 *Construction Order.* An order authorizing the CMR to proceed to construct a Component pursuant to the Component Construction Documents. A Construction Order may often be called a "Construction Component Change Order," "Component Change Order," or "CCO" within the industry. A Construction Order does not necessarily change the overall amount of a contract, but it may.

1.1.9.15 *Component Construction Documents.* The Construction Documents issued by the Design Professional with respect to a Component.

1.1.9.16 *Construction Documents.* The architectural and engineering documents setting forth the design for the Project prepared by the Design Professional. Construction Documents include, but are not limited to, the Specifications, the Drawings, the Supplementary General Requirements, the General Requirements, and all Addenda.

1.1.9.17 *Construction Progress Schedule.* A schedule indicating proposed activity sequences and durations, milestone dates for receipt and approval of pertinent information, preparation, submittal, and processing of Shop Drawings and Samples, delivery of materials or equipment requiring long-lead time procurement, and proposed date(s) of Material Completion and Occupancy and Final Completion and shall have the meaning set forth in Section 2.1.5.2. The schedule will be developed to represent the CSI Specification Divisions. It shall have a minimum number of activities as required to adequately represent to the Design Professional and the Board the complete scope of work and define the Project's critical path and associated activities. If the Project is to be phased, then each individual Phase should be identified from start through completion of the overall Project and should be individually scheduled and described, including any Board's occupancy requirements and showing portions of the Project having occupancy priority. The format of the schedule will have dependencies indicated on a monthly grid identifying milestone dates such as those listed in 1.1.9.38 below. The Design Professional shall approve the form and adequacy of the Construction Progress Schedule. If it chooses, the Board shall have final approval authority of the form and adequacy of the Construction Progress Schedule. The CMR shall submit the Original Construction Progress Schedule no later than seven (7) days after the Pre-Construction Proceed Order Date. This first submittal of the Original Construction Progress Schedule and others to follow may, if the CMR chooses, be deemed "preliminary." Until the Original Construction Progress Schedule is offered by the CMR as the "final" version, the CMR shall submit honed and updated "preliminary" Original Construction Progress Schedules as often as he sees to be fitting, and no less often than within seven (7) days of each request by the Design Professional, Board Representative, or Program Manager. Once submitted and approved in "final" form, the Original Construction Progress Schedule shall apply and be followed, and will not require revision for the submittal of an updated schedule unless provided for herein. So long as the Construction Proceed Order has been issued, the CMR shall without delay proceed with all portions of the Work it deems suitable and fitting to meet the requirements of the Contract Documents, regardless of the status of the schedule, whether preliminary or final.

1.1.9.18 *Contract.* The written document that is the evidence of the Contract between the Board and the CMR.

1.1.9.19 *Contract Documents.* The Contract Documents include the executed Contract, any Component Construction Documents, the Construction Documents, and all Change Orders.

1.1.9.20 *Contract Time.* The period of time established for completion of the Project by the Contract Documents. Contract Time commences upon the date specified in the Proceed Order and ends upon the Material Completion and Occupancy Date, as it may be amended.

1.1.9.21 *CMR.* The person or entity responsible for the proper completion of the activities described in the Contract Documents and who executes the Contract.

1.1.9.22 *Cost of the Work.* The sum of all allowable costs necessarily incurred and paid by CMR in the proper performance of the Work.

1.1.9.23 *Day.* Unless otherwise stated, reference to the terms "day," "days," "month," or "months" mean calendar day, calendar days, calendar month, and calendar months, respectively.

1.1.9.24 *Defective Work.* Work that, for any reason, is not in compliance with the Contract Documents. Defective Work is usually identified in a Notice of Non-Compliant Work.

1.1.9.25 *Design Development.* An interim step in the design process. Design Development documents consist of plans, elevations, and other drawings and outline specifications. These documents will fix and illustrate the size and character of the entire project in its essentials as to

kinds of materials, type of structure, grade elevations, sidewalks, utilities, roads, parking areas, mechanical and electrical systems, and such other work as may be required.

1.1.9.26 *Design Professional Contract.* The Contract between the Board and the Design Professional for the design of the Project.

1.1.9.27 *Design Professional.* The architect or engineer or architectural or engineering firm selected by Board (i) for the design and preparation of Contract Documents governing the construction of a Project, or (ii) for construction contract administration under the Contract Documents, or (iii) for both, all such services and the scope thereof to be set forth in the Design Professional Contract. The Design Professional is not an employee of the Board but is engaged or retained by it for the purpose of performing design and construction administration services for the project. The term “Design Professional” includes architects, engineers, surveyors, designers, and other consultants retained by the Design Professional.

1.1.9.28 *Drawings.* That part of the Contract Documents prepared or approved by the Design Professional that graphically show the scope, extent, and character of the Work to be performed by CMR. Shop Drawings and other CMR submittals are not Drawings as so defined.

1.1.9.29 *Effective Date of the Contract.* The date indicated on the Contract or as otherwise specified therein.

1.1.9.30 *Emergency.* Any situation resulting in imminent danger to the public health or safety or the loss of an essential governmental service. See (O.C.G.A. 36-91-2(7)).

1.1.9.31. *Emergency Change Order.* A Change Order which requires immediate approval in order to prevent an emergency.

1.1.9.32 *Final Certificate, Design Professional’s Certificate of Final Completion.* The Certificate issued by the Design Professional stating that all Work has been completed in accordance with the terms of the Contract Documents. See Section 6, Project Completion.

1.1.9.33 *Final Completion.* The full and final completion of all Work in accordance with the Contract Documents.

1.1.9.34 *Final Notice of Non-Compliant Work.* The Final Notice of Non-Compliant Work issued as a result of the Inspection for Substantial Completion, also known as the Final Punch List. Upon the completion or correction of this Non-Compliant Work (“punch list” work) the Design Professional will issue the Final Certificate.

1.1.9.35 *Guaranteed Maximum Price.* The maximum amount that Board is obligated to pay CMR for construction of the Project under the GMP Change Order and includes all costs and fees to be paid to CMR in connection with such the Work and the Project.

1.1.9.36 *Guaranteed Maximum Price (GMP) Change Order.* The change order setting the Guaranteed Maximum Price and authorizing the CMR to proceed to construct the Project pursuant to the Construction Documents. The GMP Change order supersedes all prior Construction Orders unless specific provisions in the GMP Change Order express otherwise.

1.1.9.37 *Stated Cost Limitation* (sometimes called the “*GMP Cost Limitation.*”) The Stated Cost Limitation shall be the maximum amount that the Owner is authorized to spend to construct the Project as determined and established by the Owner (the overall project budget). The Stated Cost Limitation does not include the cost of fixtures, furniture, or equipment unless expressly stated in the Contract Documents. After the CMR Contract is awarded, and prior to approval of the GMP Change Order, the Stated Cost Limitation may be modified in the sole discretion of the Board, as applicable. See Section 4.1.1.4 for details and effect of the Stated Cost Limitation.

1.1.9.38 *Hazardous Substances*. See Section 1 Part 6.

1.1.9.39 *Material Completion*. See Section 6.

1.1.9.40 *Milestone*. A principal event specified in the Overall Project Schedule relating to an intermediate completion date or time. Milestone events will be project-specific, but generally may include, but are not limited to: construction start, site work, completion of clearing and grubbing, grading, foundation preparation, subsurface utilities, utility completion, structural top out, dry-in, rough-in completion, metal stud and drywall completion, equipment installation, systems operational, all crucial inspections including any final by a Building Inspections Department, inspections for Material Completion, Material Completion Date, inspections for Final Completion, Final Completion Date, and other dates that may be specifically delineated in the Contract Documents.

1.1.9.41 *Notice*. Written notice. See Article 1.1.5.

1.1.9.42 *Notice of Non-Compliant Work*. A Notice of Non-Compliant Work shall be in writing, shall be dated, shall be signed by the Design Professional, and shall be addressed to the CMR with a copy to the Board, as set forth in Section 3, Part 6 (Correcting the Work) and Section 6, Part 5 (Correcting the Work after Material Completion).

1.1.9.43 *Board*. The Board of Public Education for the City of Savannah and the County of Chatham, identified as such in this Contract with whom CMR has entered into the Contract and for whom the Work is to be completed.

1.1.9.44 *Board's Representative*. Board may from time to time in writing designate one individual as Board's Representative under this Contract. Board's Representative so designated in writing shall serve as Board's Representative unless and until Board gives notice in writing of the appointment of his successor. All requests for consents and approvals required of Board in connection with the Project, whether by the Program Manager, Design Professional, CMR, Board's Construction Inspector, and or Separate Contractor, shall be submitted to Board's Representative. The Program Manager, Design Professional, CMR, Board's Construction Inspector, and Separate Contractor may rely upon written consents and approvals signed by the Board's Representative, as the consent and approval of Board, so long as said written consents and approvals are in compliance with 1.1.1.3.3.

1.1.9.45 *Overall Project Schedule*. The combined Preliminary Design and Construction Schedule and the Construction Progress Schedule that is approved by the Board .

1.1.9.46 *Pre-Commencement Phase Services*. The services required to be provided by the CMR for the Pre-Commencement Phase of the Project in accordance with the Contract Documents.

1.1.9.47 *Proceed Order*. A Proceed Order is a written notice from the Board that includes a specified date upon which the CMR is authorized to commence with a Phase of the Project. A Proceed Order is a condition precedent to the incurring of any compensable costs, including overhead costs, or the earning of and entitlement to any fees by the CMR. The Proceed Order was formerly referred to as the "Notice to Proceed."

1.1.9.47.1 *Pre-Construction Proceed Order*. The Pre-Construction Proceed Order is a written notice from the Board that includes a specified date upon which the CMR is authorized to commence with the Pre-Construction Phase of the Project. A Proceed Order is a condition precedent to the incurring of any compensable costs, including overhead costs, or the earning of and entitlement to any fees by the CMR.

1.1.9.47.1.1 *Pre-Construction Proceed Order Date*. The specific date listed in a Pre-Construction Proceed Order upon which the CMR is authorized to commence with the Pre-Construction Phase of the Project.

1.1.9.47.2 *Construction Proceed Order.* The Construction Proceed Order is a written notice from the Board that includes a specified date upon which the CMR is authorized to commence physical Work on the Site. A Construction Proceed Order is a condition precedent to the execution of any Work on the site by the CMR. A separate Proceed Order will be issued for each Component Change approved under this Contract.

1.1.9.47.2.1 *Construction Proceed Order Date.* The specific date listed in a Proceed Order upon which the CMR is authorized to commence work.

1.1.9.47.2.2 Because the CMR is responsible to have all Work Materially Complete by the Contractually-required date, the CMR shall give seven days' written notice to the Board, of the date on which the Construction Proceed Order must be issued. If the Board has a reasonable objection to the issuance of the Construction Proceed Order, or if all requirements precedent to the commencement of the subject Work have not been met by the CMR, the Board will notify the CMR no later than the Construction Proceed Order Date requested by the CMR.

1.1.9.48 *Project.* The total and complete undertaking for the public works facility to be constructed under this Contract.

1.1.9.49 *Project Manual.* A bound manual prepared by the Design Professional. It includes the Request for Proposals, the Specifications, the General Requirements and Supplementary General Requirements, and Addenda.

1.1.9.50 *Reasonable Termination Expenses.* See Section 5, Part 3.

1.1.9.51 *Samples.* Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged. The CMR shall furnish for approval all samples required by the Contract Documents. The Work shall be in accordance with approved samples.

1.1.9.52 *Schematic Design.* The beginning of the design process, sometimes commonly known as Preliminary Design. Schematic Design Documents are the schematic design plans and elevations showing the scale and relationship of Project or its Components. Schematic Design documents consist of written and graphic (drawings, sketches, and other things) presentations that will enable the Board (through the advice of the Executive Administrator) to determine if the intent of the project, as set forth in the Program provided by the Board, is being addressed, and shall consist of at least the following: (a) Schematic Site Plan; (b) Floor Plans; and (c) Elevations.

1.1.9.53 *Separate Contractor.* Any person or entity other than CMR that enters into an agreement with Board to perform the construction of all or any portion of the construction on a Project.

1.1.9.54 *Site.* Lands or areas indicated in the Contract Documents as being furnished by the Board upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by the Board that are designated for the use of the CMR. Also referred to as Project Site, Job Site and Premises.

1.1.9.55 *Specifications.* That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto. The term "Specifications" shall also include all written matter in the Project Manual or on the drawings and any Addenda or Change Orders thereto.

1.1.9.56 *Subcontractor.* The generic term subcontractor as employed herein includes only those subordinate contractors having a direct contract with the CMR or any Trade Contractor to the CMR performing work specified pursuant to this Contract.

1.1.9.57 *Submittals*. Shop Drawings, schedules, data, catalogue cuts, manufacturers' published recommendations, charts, bulletins, brochures, illustrations, circulars, roughing drawings or formulae, and other things, that are specifically prepared, distributed, or assembled by or for CMR or by Subcontractors, manufacturers, or Suppliers and submitted by CMR to illustrate some portion of the Work or for use in installing the Work. The Contract Documents shall specify when shop drawings or submittals require the seal of a specialty consultant.

1.1.9.58 *Supplier*. A manufacturer, fabricator, distributor, supplier, or vendor of goods or equipment in connection with the Work, or any other party having a Contract or Purchase Order with the CMR or with a Subcontractor to furnish materials or equipment to be incorporated in the Work by the CMR or a Subcontractor.

1.1.9.59 *Trade Contractor*. A Subcontractor who furnishes and installs materials according to the plans and specifications of this Project but does not include one who merely furnishes materials. See 1.1.9.51.

1.1.9.60 *Underground Facilities*. All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including without limitation those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

1.1.9.61 *Unit Price Work*. Work to be paid for on the basis of unit prices as defined and described in the Contract Documents. A percentage markup for overhead or profit shall be included in all unit prices.

1.1.9.62 *SCCPSS*. The entity for which the Project is being constructed. The term may include the following: Savannah Chatham-County Public School System and/or The Board of Public Education for the City of Savannah and the County of Chatham.

1.1.9.63 *SCCPSS' Representative*. The Board may designate from time to time a SCCPSS Representative, who shall work with the Design Professional and the Board's Representative as a liaison with the SCCPSS.

1.1.9.64 *Work*. All labor, materials, equipment and services necessary to produce the construction of the Project in accordance with the Contract Documents, including the entire construction or the various separately identifiable parts thereof. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all equipment, fixtures, and supplies into such construction, all as required by the Contract Documents.

1.1.9.65 *Request For Information (RFI)*. An inquiry submitted by the CMR to the DP, requesting clarification or direction. All inquiries other than those considered by the DP to be of low significance, must be submitted and tracked as an RFI. As applicable, each RFI submitted must include information from the CMR regarding any cost or time implications of which he is aware at the time the RFI is submitted. All RFIs must be copied to SCCPSS; in the event SCCPSS wishes to discuss the ASI with the DP or with the CMR, or vice-versa, this should occur immediately upon receipt.

1.1.9.66 *RFI Response*. DP's response to an RFI submitted by the CMR, providing clarification or direction in response to the CMR's inquiry. Unless addressed specifically within the DP's response, the RFI Response, regardless of whether the RFI as submitted includes an indication from the CMR of any cost or time implications, and regardless of whether or not it states the following, shall not be construed by the CMR to provide authorization for compensable changes in the Work, or for an increase in Contract Time. In the event the CMR considers that an RFI Response should affect the Contract Amount or Contract Time, he shall immediately advise the DP and SCCPSS, and shall provide a COP within seven (7) days of receipt of the RFI Response, unless the DP considers it necessary to issue an WCPR, in which case the CMR shall provide a

COP within seven (7) days of receipt of the WCPR. In the event the CMR considers that an RFI Response will not increase the Contract Amount or Contract Time, he shall proceed without delay according to the RFI Response, and by doing so without notice he does indicate full agreement to the RFI Response at no increase in Contract Amount or Contract Time. All RFI Responses must be copied to SCCPSS; in the event SCCPSS wishes to discuss the ASI with the DP or with the CMR, or vice-versa, this should occur immediately upon receipt. An RFI Response, once confirmed in writing or by performance of Work by the CMR according to the RFI Response, shall become a part of the Contract Documents.

1.1.9.67 *Design Professional's (Architect's) Supplemental Instruction (ASI)*. DP's issuance of a document to provide clarification or direction with respect to the design documents to the CMR. Unless addressed specifically within the ASI, it shall, regardless of whether or not it states the following, not be construed by the CMR to provide authorization for compensable changes in the Work, or for an increase in Contract Time. In the event the CMR considers that a ASI should affect the Contract Amount or Contract Time, he shall immediately advise the DP and SCCPSS, and shall provide a COP within seven (7) days of receipt of the ASI, unless the DP considers it necessary to issue an RFP, in which case the CMR shall provide a COP within seven (7) days of receipt of the RFP. In the event the CMR considers that an ASI will not increase the Contract Amount or Contract Time, he shall proceed without delay according to the ASI, and by doing so without notice he does indicate full agreement to the ASI at no increase in Contract Amount or Contract Time. All ASIs must be copied to SCCPSS; in the event SCCPSS wishes to discuss the ASI with the DP or with the CMR, or vice-versa, this should occur immediately upon receipt. Each ASI is a part of the Contract Documents.

1.1.9.68 *Work Change Proposal Request (WCPR)*. DP's issuance of a document to provide clear and concise information for the purpose of requesting that the CMR provide a proposal for a specific change in the Work. Each WCPR will typically be instigated by a SCCPSS request, RFI Response, or ASI, and must as applicable include clear reference to any and all previous tracking documents from which it emerged. In response to each RFP, the CMR shall provide a COP within seven (7) days of receipt. All WCPRs must be copied to SCCPSS; in the event SCCPSS wishes to discuss the DSI with the DP or with the CMR, or vice-versa, this should occur immediately upon receipt of the RFP.

1.1.9.69 *Change Order Proposal (COP)*. CMR's proposal for a clear and concise description of a specific change in the Work. Each COP will typically be in response to an RFP, but may also be in response to an RFI Response, or to an ASI, and must as applicable include clear reference to any and all previous tracking documents from which it emerged. All COPs must be copied to SCCPSS; in the event SCCPSS wishes to discuss the COP with the DP or with the CMR, or vice-versa, this should occur immediately upon receipt.

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PART 2 – CMR’S GENERAL RESPONSIBILITIES AND DUTIES

1.2.1 General Responsibilities.

1.2.1.1 Representations of CMR.

1.2.1.1.1 Independent Contractor; Fiduciary Role. The CMR represents that it is an independent contractor, competent, knowledgeable, and familiar with the type of Work contemplated by this Contract. The CMR agrees and understands that neither it nor any of its agents or employees may act in the name of the Board except and unless specifically authorized in writing by the Board to do so. The CMR further represents that it accepts a fiduciary role and responsibility with respect to the Board and that it owes the Board the duties of good faith, trust, confidence, and candor, and that it must exercise a high standard of care in managing money and property. The CMR will, to its best abilities, act in the best interests of the Board and the timely completion of the Work. The CMR shall furnish design review, construction administration and management services and use the CMR’s best efforts to construct the Project in an expeditious and economical manner consistent with the interests of the Board.

1.2.1.1.2 Familiarity with Project. CMR represents that it has: (a) visited the Project Site(s), (b) taken such other steps as may be necessary to ascertain the nature and location of the Project Work and the general and local conditions that affect the Project Work or the cost thereof, (c) investigated the labor, materials, and subcontract situations as regards to the Project, (d) examined the Property(ies), the obstacles that may be encountered and all other conditions having a bearing upon the performance of the Project Work, the superintendence of the Project Work, the time of completion and all other relevant matters, and (e) reported to Board in writing the results of all of the foregoing.

1.2.1.2 Responsibility to Coordinate. CMR acknowledges its responsibility to coordinate the Project Work with that of the separate contractors to be selected for the installation of other work within the Project, or in the proximity of the Project. CMR expressly agrees to schedule and, with the assistance of Board, coordinate the Project Work with such separate contractors in order to assist them and permit each phase of the Project to be completed on schedule.

1.2.1.3 Definition of Project Criteria. Board shall be responsible for defining Project criteria as to expectations for program design, cost, and construction schedule. CMR shall be responsible for delivering all construction services necessary to complete improvements that satisfy the Project criteria promulgated by Board. Additionally, CMR shall be responsible for providing timely feedback to Board relating to Project design, budget, and schedule to allow Board to make value-based judgments throughout the development and construction process.

1.2.1.4 CMR’s Review of the Construction Documents and Participation in Design Coordination Meetings. The CMR shall review the Construction Documents to understand the requirements of the Project. The CMR shall actively participate in Design Coordination Meetings with the Design Professional, Board, and SCCPSS for the purpose of collaborating and coordinating the final design and Construction Documents. The CMR is responsible for cooperating and assisting in the coordination of the development of the design of the Project within the budgeted cost and schedule. The objective of the coordination is to assure that the design meets the Program in all respects, including but not limited to the following areas:

- Cost containment and cost monitoring;
- Cost-effective decisions;
- Compatibility with Board’s architectural standards.
- Consistency with the Board’s expectations;
- The appropriate provision of all necessary services and utilities;
- The necessary level of environmental review and documentation;
- That the Board / SCCPSS are kept fully aware of the progress of the project;
- That the project schedule is maintained;
- That construction quality assurance complies with the ' Program;

- That the Construction Documents are reviewed for constructability, coordination between trade disciplines, mistakes, errors, omissions, flaws of any kind; and
- That all permits and approvals are obtained for the Board to occupy the Project.

1.2.1.5 Project Delivery. The CMR shall commence the Basic Services within the time frame specified in the Pre-Construction Proceed Order. During the Construction Phase, the CMR shall commence physical work at the Site as of the Construction Proceed Order Date specified in or provided after the first Construction Order or Guaranteed Maximum Price Change Order issued by the Board. CMR shall construct the Project in accordance with the Contract Documents, and shall diligently perform all the Work required by the Contract Documents or reasonably inferable from industry standards and code requirements. CMR shall deliver the Project completed in accordance with the Contract Documents, free from defects, and within the Contract Time.

1.2.1.6 CMR’s Consultation Concerning Replacement of Work. The CMR shall provide consultation concerning replacement of Work damaged by fire or other cause during construction, and furnish all Basic Services required in connection with the replacement of such Work. Such consultation will be considered an additional service and will be provided pursuant to a Change Order unless the fire or other damage was caused as a result of the negligence of the CMR or its subcontractors. If the cost of the replacement or repair of the damage is reimbursable under the terms of any insurance policy, the full amount of any such insurance recovery shall be applied to the Project for the benefit of the Board.

1.2.2 General Duties. The CMR accepts the relationship of trust and confidence established between it and the Board by this Contract. The CMR agrees to furnish all services that are necessary or appropriate to complete fully all required Basic Services as defined in the Contract Documents. The CMR also agrees to furnish efficient business administration and superintendence to complete fully all required Basic Services and Work.

1.2.2.1 Provision and Payment for Basic Services and the Work. Unless otherwise provided in the Contract Documents, the CMR shall provide and pay for all labor, materials, equipment, transportation, construction, resources, Work, applicable taxes and fees, and services necessary or incidental to completing the Work for each phase or Component of the Project in a proper and timely manner in accordance with the Contract Documents and applicable laws, whether temporary or permanent and whether or not incorporated or to be incorporated in the Project.

1.2.2.2 Supervision and Direction. CMR shall supervise and direct the Work using diligence, skill, competence, and attention. CMR shall be responsible for and shall coordinate all construction means, methods, techniques, sequences, and procedures. (See *also* Section 3.)

1.2.2.3 Enforce Discipline. CMR shall at all times enforce strict discipline and good order among its employees, Subcontractors, and others performing the Work, and shall not employ or permit the employment of unfit persons or persons not skilled in the task assigned to them.

1.2.2.4 Security Clearances. Where Work is required within a specially secured controlled access environment, Work shall be performed by personnel who have passed a security screening.

1.2.2.5 Maintain Records. CMR shall keep Board informed of the progress of the Work. CMR shall maintain records of the cost for the Work pursuant to and in compliance with GASB 34 accounting requirements or such other methods as Board may require, including complete backup documentation for all pay applications.

1.2.2.6 Answer Questions. CMR, with reasonable promptness and in accordance with time limits set by Board, shall answer Board’s questions and provide Board with requested Project information.

1.2.2.7 Acts and Omissions. Employees of or Subcontractors to the CMR shall perform the Work required by this Contract. The CMR is responsible to the Board for acts and omissions of the CMR’s employees, Subcontractors and their agents and employees, and other persons.

1.2.2.8 Promptly Commence. Upon receipt of a Proceed Order from the Board, the CMR shall promptly commence and diligently pursue the performance of the Basic Services described in this Contract.

1.2.3 General Consultation Services. As a part of Basic Services, CMR shall provide the following consultation services to Board :

1.2.3.1 Construction Progress Meetings. CMR shall schedule and conduct meetings with the Board, Design Professional, Separate Contractors, and appropriate Subcontractors, not less than biweekly, for the purpose of discussing the status and progress of the Work. Such meetings shall be held as often as the Board determines.

1.2.3.2 Advice Concerning Revisions. CMR should advise the Board, Design Professional and SCCPSS regarding revisions in connection with Site use and improvements, selection of materials, building systems and equipment, construction feasibility, availability of materials and labor, time requirements for installation and construction, other factors related to costs (including costs of alternative designs or materials, preliminary budgets and possible economies), and scheduling of design and construction services and perform and provide life-cycle costs and value engineering analyses and other studies for such purposes.

1.2.3.3 Advice and Assistance with Utilities. CMR shall coordinate with the Board concerning any disruption of utilities including water, sewer, electrical, gas, telephone, and/or other utility services. CMR shall also advise and assist the Board and Design Professional with the preparation of any and all applications for water, sewer, electrical, gas, telephone, and other utility services necessary for the completion and operation of the Project.

1.2.3.4 Advice on Market Conditions. The CMR shall consult with the Design Professional and provide advice as to construction market conditions and scheduling factors.

1.2.3.5 Names of Trade Contractors. The CMR, as soon as practicable after the commencement of this Contract shall furnish to the Design Professional the written names of the persons or entities the CMR proposes to engage as Trade Contractors for the Project subject to such persons or entities being approved or deemed approved in accordance with provisions of the Contract Documents.

1.2.3.6 Names of Vendors. The CMR shall provide the Design Professional a list of contractors, and vendors whose services may be required in the purchasing of materials and services for the construction of the Project.

1.2.3.7 Tests, Studies, and Other Things. The CMR shall provide any tests, analyses, studies, or reports that may be required.

1.2.3.8 Easements and Other Legal Authorizations. If the CMR knows or learns of the need to obtain easements, or legal authorizations regarding site utilization, the CMR shall promptly notify the Board where essential to the execution of the Board’s program.

1.2.4 Other Actions. CMR shall perform all other actions required in the supervision of the Work and the completion of the construction of the Project. Board and CMR acknowledge that the Contract Documents supersede all prior negotiations, discussion, statements, and agreements between Owner and CMR and constitute the full, complete, and entire agreement between Board and CMR.

1.2.5 Existing Documents. CMR recognizes the existence of existing contract documents, if any, prepared on behalf of the Board and identified in Exhibit A. The CMR has carefully reviewed these documents, if any, and has determined them to be, at the time of execution of this Contract, complete and sufficient for the construction of the portion of the project for which they were produced. The CMR has made, or will make within 15 days, with the assistance of the Board and Design Professional, any correction or adjustments necessary to their use prior to beginning any construction of the Work identified on such documents.

1.2.6 Duty to Give Notice to Board. If the Board, the Design Professional, or any other person with whom the Board or Design Professional respectively has a direct contractual relationship shall, in the judgment of the CMR, acts or fails to act in such a manner as to (i) delay the progress of the construction of the Project or (ii) increase the cost of the Project, CMR shall give prompt notice to Board so as to permit Board to take corrective action.

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PART 3 – BOARD’S RESPONSIBILITIES AND RIGHTS

1.3.1 Board’s Representative.

1.3.1.1 Written Designation. The Board shall designate, in writing, an appropriate Board’s representative. The Board hereby designates the party identified in the Contract as its initial authorized representative and reserves the right to designate additional or replacement representatives by written notice to the contractor. The Board’s Representative has only limited authority to act without formal approval of the Board of Education. In this regard, See Section 1.1.1.3.3 above.

1.3.1.2 Accessibility. The Board’s Representative shall be readily accessible (either on site or by computer, phone or fax or otherwise) shall be fully acquainted with the Project, and shall have authority promptly to render decisions, approve Construction Documents, Budgets, Schedules and Change Orders and to furnish information required of or to be provided by the Board hereunder.

1.3.1.3 Independent Review and Inspection. The Board may obtain independent review of the Contract Documents by a separate architect, engineer, contractor, or cost estimator under contract to or employed by the Board. Such independent review shall be undertaken at the Board’s expense in a timely manner and shall not delay the orderly progress of the Work. The Board may undertake independent inspection of the installation of the construction. Such independent inspector shall operate as the agent of the Board and shall have the authority to stop the Work in order to protect the best interests of the Project or the Board. The Board’s election to acquire any independent review and inspection services, shall not change the responsibility and duty of the CMR to provide the quality control and quality assurance as defined in the Contract Documents, nor does it affect the responsibilities and obligations of the Design Professional.

1.3.2 Design Professional.

The Board shall retain a qualified Design Professional, who shall perform according to the Agreement between the Board and the Design Professional, and according to the responsibilities set forth in this Contract, including the following:

1.3.2.1 Design Professional to Design Work. The Design Professional Contract requires the Design Professional to design and to prepare the Contract Documents, a copy of which shall be furnished to the CMR upon request. The Design Professional Contract requires the Design Professional to designate a readily accessible representative (either on Site or by computer, phone or fax or otherwise) who shall have authority promptly to render decisions and to furnish information required of the Design Professional.

1.3.2.2 Copies of Contract Documents to CMR. See Section 1.1.7.2.

1.3.2.3 Contract Administration. The Design Professional shall provide periodic review of the Work to assess compliance with the Contract Documents. The Design Professional shall not review any Work in respect to safety. The Design Professional is not the agent of the Board, but is engaged as a consultant to the Board to assist the Board in determining if the conditions of the contract have been met. He is the agent of the Board only when in special instances he is authorized in writing by the Board so to act, and in such instances he shall, upon request, show the Contract written authority. He has authority to stop the Work whenever such stoppage may be necessary to enforce the proper execution of the Contract.

1.3.2.4 Impartial Decisions. The Design Professional is the interpreter of the conditions of the CMR Contract and the judge of its performance, in the first instance. The Design Professional shall side neither with the Board nor with the CMR, but shall use its powers to enforce performance by both.

1.3.2.5 Design Professional Decisions. Design Professional’s decisions must be in writing and signed by the Design Professional of Record.

1.3.2.5.1 Promptness. The Design Professional shall make decisions within twenty-one (21) calendar days after proper presentation of evidence on (1) any issue, claim, or dispute of the Board or CMR, or (2) a demand of the Board or CMR for a decision on any matter relating to the execution

or progress of the Work.

1.3.2.5.2 **Additional Time.** If because of events beyond the Design Professional’s reasonable control, it is not able to meet the specified time period, then it should be entitled to ask the Board for additional time, which request shall not be unreasonably denied.

1.3.2.5.3 **Protests of Design Professional’s Decisions.** All decisions of the Design Professional on any claim, dispute, or demand shall be final and binding on the Contract in the absence of written notice of protest from the Contract received by the Board within fourteen calendar days of the date of the decision of the Design Professional is received by the contractor. See Section 5 Part 2.

1.3.2.6 **Aesthetics.** All decisions of the Design Professional on matters of aesthetics are final, conclusive, and binding on all parties if consistent with the requirements of the Contract Documents.

1.3.2.7 **Succession.** In case of the termination of the employment of the Design Professional, the Board shall appoint a capable and reputable Design Professional against whom the CMR makes no reasonable objection and whose status under the Contract shall be that of the former Design Professional.

1.3.2.8 **Board’s Right to Render Final Decisions.** The Board shall and shall be expected by the CMR to rely on the advice, direction, and decisions of the Design Professional. However, and despite any other provisions, the Board shall have the right to override the Design Professional regarding any advice, direction, or decision. In any event this occurs, and the decision made by the Board conflicts with any code requirements or raises concerns of safety, the Design Professional shall immediately issue to the Board a written statement to inform the Board of the conflict and/or concern.

1.3.3 Permits, Licenses, and Inspections. The Board shall cooperate with the CMR as the CMR secures building and other permits, licenses and inspections.

1.3.4 Testing. The Board shall provide and pay for initial and subsequent independent construction testing as required by the Contract Documents. Laboratories for testing services shall be pre-qualified by the Board (where applicable), selected by, engaged by, and responsible to the Design Professional. In the case of tests (a) prescribed in the Contract Documents or any part thereof, or (b) requested by the Design Professional, the CMR must give notice to the selected testing agency stating the date and the hour when he will be ready for the test to be made. In the event the test fails or the CMR is not ready for the test, the expense of the services of the testing laboratory shall be deducted from the Contract Sum, upon notice to the CMR by the Board accompanied by a copy of the invoice for the testing services for the test that failed or for which the CMR was not ready. The notice and readiness provisions of this Section do not apply to verification of design mix on concrete.

1.3.5 No Partial Occupancy. There shall be no partial occupancy of the Project prior to the achievement of Material Completion. This provision may be modified in the Supplementary General Conditions only for phased construction projects with stand-alone components, or may be modified by Change Order.

1.3.6 Disqualification of Potential “Pre-Qualified” Subcontractors. The Board may disqualify for just cause any pre-qualified potential subcontractors identified in the Bidding Documents. Board shall pay any difference in the cost of the Work resulting from such disqualification.

1.3.7 Board’s Right to Perform Work. The Board reserves the right to perform construction or operations related to the Project with Separate Contractors on the Site concurrent with the CMR construction; or to separately bid work that the Owner deems in its best interest. The Board shall have the right to charge the CMR in the event there is insufficient progress of Work or lack of remedial Work by the CMR upon notice to the CMR by the Board accompanied by a copy of the invoice(s) for the services performed and supplies furnished. If the CMR claims that delay or additional cost is because of such action by the Board, the CMR shall assert such claims as provided in Section 5, Part 2 of the General Requirements.

1.3.8 Board's Independent Consultants. In the event the Board, at its sole discretion, shall either itself perform or retain one or more independent consultants to provide peer review, expert opinion, or other analysis of design, the Construction Documents, or construction as performed in the field, the CMR agrees that any such review or analysis shall not constitute any admission concerning the adequacy, fitness, or completeness of the design, the Construction Documents, or the adequacy or compliance of the construction to the specifications. Such consultant reports are expert opinion rendered solely to the Board and shall not be used in connection with any claim or legal action arising out of or related to the Project without the express written consent of the Board, unless required by the provisions of the Civil Practice Act governing the designation and use of expert witnesses.

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PART 4 – PROTECTION OF PERSONS AND PROPERTY

1.4.1 Reasonable Precautions. The CMR shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury or loss to: (a) employees performing the Work and other persons, including without limitation the General Public, who may be affected thereby; (b) the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site, under care, custody, or control of the CMR or the CMR's Subcontractors; or (c) other property at or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation, replacement or other rearrangement in the course of construction.

1.4.2 Duty to Protect Property. The CMR shall continuously maintain adequate protection of the Work from damage and shall protect all other property on the Site from damage, injury, or loss regardless of who may be the owner of said property and CMR shall make good any such damage, injury, or loss.

1.4.3 Safety Precautions. The CMR shall comply with the rules and regulations of OSHA and the Department of Labor (O.C.G.A. Section §34-2-6), and, where not inconsistent with the foregoing, the "Manual of Accident Prevention in Construction" issued by the Associated General CMRs of America, Inc., for safety and prevention of accidents, and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work arising out of and in the course of employment on work under the Contract. The CMR shall report any injury requiring medical attention or causing loss of time from work arising out of and in the course of employment on work under the contract to the Board and the Program Manager. The CMR alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage that may result from their improper construction, maintenance, or operations. He shall erect and properly maintain at all times, as required by the conditions and progress of the Work, proper safeguards for the protection of workers and the public and shall post danger warnings against any hazards created by the construction operations. The CMR shall designate a responsible member of his organization, normally the superintendent, whose duty shall be the prevention of accidents.

1.4.4 Emergencies. In an emergency affecting the safety of persons or property or the Work or of adjoining property, the CMR shall take reasonable precautions to prevent imminent damage, injury, or loss.

1.4.5 Fire Protection. CMR shall take adequate and reasonable precautions to protect the Work against damage by fire and smoke. For example, without limitation, CMR shall do the following:

- (a) Provide fire extinguishers or fire hoses in readily accessible locations;
- (b) Periodically inspect fire extinguishers, remove discharged extinguishers immediately, and replace with new or recharged extinguishers;
- (c) Keep fire extinguishers or fire hoses within five (5) feet of any welding or open flame operations;
- (d) Remove oil-soaked and paint-soaked materials, including paper and rags, from the Site daily, and more frequently as necessary, to eliminate danger of fire.
- (e) Prohibit workers from smoking during operations involving combustible adhesives, solvents, mastics, or other fire hazard materials.

1.4.6 Remedy Damages. The CMR shall promptly remedy damages and loss to property at the Site caused by the CMR, by any Subcontractor, by anyone directly or indirectly employed by the CMR or any such Subcontractor, or by anyone for whose acts the CMR or any such Subcontractor may be liable. Should the CMR cause damage to any Separate CMR's work, the CMR agrees, upon due notice, to settle with the Separate CMR.

1.4.7 Written Programs. CMR shall have written environmental, quality control, crisis/emergency management, health and safety programs in place with a designated (qualified) coordinator as the point of contact during the project. Such plans shall be on the Site and the superintendent and the project management team shall be familiar with and utilize such programs.

PART 5 – BONDS, INDEMNITY AND INSURANCE

1.5.1 Bonds

1.5.1.1 Performance Bond and Payment Bond. The CMR shall furnish both a performance bond and a payment bond in the exact form set forth in Section 7, (Forms) of these General Conditions. If a Construction Order is authorized, the CMR shall furnish said bonds (or a corresponding increase in the Penal Sum of said bonds) concurrent with each Construction Order.

1.5.1.2 Required Qualifications for Surety. The Contract provides that the surety and insurance companies must be acceptable to the Board. Only those sureties listed in the Department of Treasury's Listing of Approved Sureties (Department Circular 570) are acceptable to the Board. All bonds at the time of issuance must be issued by a company authorized by the Insurance Commissioner to transact the business of suretyship in the State of Georgia, and shall have a Best Policyholders Rating of "A-" or better and with a financial size rating of Class V or larger.

1.5.1.3 Penal Amount of Bonds, State Law. The CMR acknowledges and agrees that, pursuant to O.C.G.A. Title 36 Chapter 91 the performance bond and the payment bond must be in a penal amount equal to at least 100% of the sum of authorized Construction Orders, the Stated Cost Limitation, or GMP Change Order when established. Accordingly, the CMR warrants and agrees that, for any subsequent Change Order increasing the GMP by five percent or more or when the total cost of the work has increased by five percent or more, it shall obtain a written amendment to the payment bond and the performance bond increasing the penal amounts of both bonds to 100% of the GMP, effective as of the date of the Change Order. The premium increase, if any, may be properly included in the cost of the Change Order. The Design Professional shall approve no payment for the work provided by the Change Order until the CMR has provided the written amendment to the Board.

1.5.2 Liability and Indemnification.

1.5.2.1 General Liability. The CMR shall be responsible to the Board from the time of the signing of the agreement or the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from any negligent act or omission or breach, failure or other default regarding the Work by the CMR, or any of its Subcontractors, its agents, employees or others working at the direction of the CMR or on its behalf, regardless of who may be the owner of the property.

1.5.2.2 Indemnification Agreement. CMR hereby agrees to indemnify and hold harmless the Owner, and all of its respective elected school board members, officers, and employees (hereinafter collectively referred to as the "Indemnitees") from and against any and all claims, demands, liabilities, losses, costs or expenses, including attorneys' fees, made by a third party or parties, for any loss due to bodily injury (including death), personal injury, and property damage to the extent arising out of or resulting from the performance of this Contract or the negligence, recklessness, or intentional wrongful conduct of the CMR, its agents, employees or others utilized by the CMR in the performance of this Contract, or due to any breach of this Contract by the CMR, or due to the application or violation of any pertinent Federal, State or local law, rule or regulation. This indemnification extends to the successors and assigns of the CMR. This indemnification obligation survives the termination of the Contract and the dissolution or, to the extent allowed by law, the bankruptcy of the CMR. The parties do not intend for this indemnification provision to extend to claims, demands, liabilities, losses, costs or expenses, including attorneys' fees, made by a third party or parties, for any loss due to bodily injury (including death), personal injury, or property damage caused solely by the negligence, recklessness, or intentional wrongful conduct of the Indemnitees.

1.5.2.2.1 This indemnification does not extend beyond the scope of this Contract and the work undertaken thereunder. Nor does this indemnification extend to claims for losses or injuries or damages incurred due to the sole negligence, recklessness, or intentional wrongful conduct of the Indemnitees.

1.5.2.2 This indemnification does not extend to claims for loses or injuries or damages incurred by the Indemnitees due to any negligent act, error, or omission of a design professional in the performance of professional services that fails to meet the applicable professional standard of care, skill and ability as employed by others in their profession.

1.5.2.3 Suits or Claims for Infringement. The CMR shall indemnify and hold the Board harmless from any suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods, or systems used by the CMR.

1.5.3 Insurance Requirements.

1.5.3.1 Insurance Certificates. The CMR shall, in accordance with 2.1.2.2, procure the insurance coverages identified below at the CMR's expense (e.g. within GMP) and shall furnish the Board an insurance certificate listing the Board as the certificate holder and as an additional insured and _____ as an additional insured. Evidence of insurance coverages shall be provided on the form shown in Section 7 or on a form acceptable to the Board. The insurance certificate must provide the following:

- (a) Name and address of authorized agent
- (b) Name and address of insured
- (c) Name of insurance company(ies)
- (d) Description of policies
- (e) Policy Number(s)
- (f) Policy Period(s)
- (g) Limits of liability
- (h) Name and address of Board as certificate holder
- (i) Project Name and Number
- (j) Signature of authorized agent
- (k) Telephone number of authorized agent
- (l) Mandatory thirty (30) day notice of cancellation or non-renewal (except ten days for non payment).

1.5.3.2 Insurer Qualifications, Insurance Requirements. Each of the insurance coverages required below (i) shall be issued by a company licensed by the Insurance Commissioner to transact the business of insurance in the State of Georgia for the applicable line of insurance, and (ii) shall be an insurer (or, for qualified self-insureds or group self-insureds, a specific excess insurer providing statutory limits) with a Best Policyholders Rating of "A-" or better and with a financial size rating of Class V or larger. Each such policy shall contain the following provisions:

1.5.3.2.1 The insurance company agrees that the policy shall not be canceled, changed, allowed to lapse or allowed to expire until thirty days after the Board has received written notice thereof, except ten days notice shall be required in the event of cancellation for non-payment of premium as evidenced by return receipt of certified mail or statutory mail, or until such time as other insurance coverage providing protection equal to protection called for in this Contract shall have been received, accepted and acknowledged by the Board. Such notice shall be valid only as to the Project as shall have been designated by Project Number and Name in said notice.

1.5.3.2.2 The policy shall not be subject to invalidation as to any insured by reason of any act or omission of another insured or any of its officers, employees, agents or other representatives ("Separation of Insureds").

1.5.3.2.3 Any attorney retained by the CMR or its insurance carrier to provide a defense of any Indemnatee shall be subject to the approval of the Indemnitees, which approval shall not be unreasonably withheld. In the event of litigation, any settlement on behalf of the Indemnatee must be expressly approved by the Board. The Board reserves at all times the right to retain, at its own expense, counsel to assist in the defense of any Indemnatee, in

which case there shall be mutual cooperation between the Board's counsel and any counsel provided by the CMR or its insurance carrier.

1.5.3.2.4 All deductibles shall be paid for by the CMR.

1.5.3.2.5 Self-insured retention, except for qualified self-insurers or group self-insurers, in any policy shall not exceed \$100,000.00.

1.5.3.3 Required Insurance Coverages. The CMR also agrees to purchase insurance and have the authorized agent state on the insurance certificate that the CMR has purchased the following types of insurance coverages, consistent with the policies and requirements of Georgia Law and the Board . The minimum required coverages and liability limits are as follows:

1.5.3.3.1 Workers' Compensation Insurance. The CMR agrees to provide at a minimum Workers' Compensation coverage in accordance with the statutory limits as established by the General Assembly of the State of Georgia. A group insurer must submit a certificate of authority from the Insurance Commissioner approving the group insurance plan. A self-insurer must submit a certificate from the Georgia Board of Workers' Compensation stating the CMR qualifies to pay its own workers' compensation claims. The CMR shall require all Subcontractors performing work under this Contract to obtain an insurance certificate showing proof of Workers' Compensation Coverage and shall submit a certificate on the letterhead of the CMR in the following language:

This is to certify that all subcontractors performing work on this Project are covered by their own workers' compensation insurance or are covered by the CMR's workers' compensation insurance.

1.5.3.3.2 Employers' Liability Insurance. The CMR shall also maintain Employer's Liability Insurance Coverage with limits of at least:

- (i) Bodily Injury by Accident - \$1,000,000 each accident; and
- (ii) Bodily Injury by Disease - \$1,000,000 each employee.

The CMR shall require all Subcontractors performing work under this Contract to obtain an insurance certificate showing proof of Employers Liability Insurance Coverage and shall submit a certificate on the letterhead of the CMR in the following language:

This is to certify that all subcontractors performing work on this Project are covered by their own Employers Liability Insurance Coverage or are covered by the CMR's Employers Liability Insurance Coverage.

1.5.3.3.3 Commercial General Liability Insurance. The CMR shall provide Commercial General Liability Insurance (2002 or 2003 ISO Occurrence Form or equivalent) that shall include, but need not be limited to, coverage for bodily injury and property damage arising from premises and operations liability, products and completed operations liability, blasting and explosion, collapse of structures, underground damage, personal injury liability and contractual liability. The CGL policy must include separate aggregate limits per Project and shall provide at a minimum the following limits:

	<i>Coverage</i>	<i>Limit</i>
1.	General Aggregate	\$ 2,000,000.00 per Project
2.	Products-Co./Op Agg	\$ 1,000,000.00 per Occurrence
3.	Personal & Adv Injury	\$ 1,000,000.00 per Occurrence
4.	Contractual	\$ 1,000,000.00 per Occurrence
5.	Each Occurrence	\$ 1,000,000.00

Additional Requirements for Commercial General Liability Insurance are shown below at Paragraph 1.5.3.3.6.

1.5.3.3.4 Commercial Business Automobile Liability Insurance. The CMR shall provide Commercial Business Automobile Liability Insurance that shall include coverage for bodily injury and property damage arising from the operation of any owned, non-owned, or hired automobile. The Commercial Business Automobile Liability Insurance Policy shall provide not less than \$1,000,000 Combined Single Limits for each occurrence. Additional Requirements for Commercial Business Automobile Liability Insurance are shown below at Paragraph 1.5.3.3.6.

1.5.3.3.5 Commercial Umbrella Liability Insurance. The CMR shall provide a Commercial Umbrella Liability Insurance to provide excess coverage above the Commercial General Liability, Commercial Business Automobile Liability and the Workers' Compensation and Employers' Liability to satisfy the minimum limits set forth herein. The umbrella coverage shall follow form with the Umbrella limits required as follows:

<i>For Contract Amounts Less or Than \$5,000,000.00:</i>	<i>For Contract Amounts Equal to Greater than \$5,000,000:</i>
\$ 2,000,000 per Occurrence	\$2,000,000 per Occurrence
\$ 4,000,000 Aggregate	\$10,000,000 Aggregate

Additional Requirements for Commercial Umbrella Liability Insurance are shown below at Paragraph 1.5.3.3.6.

1.5.3.3.6 Additional Requirements for Commercial Policies in Paragraphs 1.5.3.3.3 through 1.5.3.3.5

(a) All insurance policies, other than the Professional Liability policy and the Workers Compensation policy, provided by CMR to meet the requirements of this Agreement shall name **"The Board of Public Education for the City Of Savannah and the County of Chatham"** as those terms are defined below, as an additional insureds as to the operations of CMR under the Contract Documents and shall contain a severability of interests provisions.

The term **"The Board of Public Education for the City of Savannah and the County of Chatham."** shall include the The Board of Public Educaiton for the City of Savannah and the County of Chatham, the body corporate responsible for public education in the City of Savannah and the County of Chatham (sometimes referred to herein as the "Board," the "District", or the "Owner"), the individual Board Members comprising the elected School Board that serves as the District's governing body, and all of the officers, employees or other agents of the District in their official capacity, and/or while acting on behalf of or at the direction of **The Board of Public Education for the City of Savannah and the County of Chatham**.

(b) The policy must be on an "occurrence" basis.

1.5.3.3.7 Builders Risk Insurance. CMR shall provide a Builder's Risk Policy to be made payable to the Board and CMR, as their interests may appear. The policy amount should be equal to 100% of the Contract Sum, written on a 1991 Cause of Loss-Special Form, or its equivalent. The policy shall be endorsed as follows:

The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy:

- (i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; and
- (ii) Partial or complete occupancy by Board ; and
- (iii) Performance of work in connection with construction operations insured by the Board, by agents or lessees or other CMRs of the Board or

In the event that the Contract is for renovation, addition or modification of an existing structure and Builders Risk Insurance is not available, the Board will accept an Installation Floater Insurance Policy with the above endorsements in lieu of the Builders' Risk Insurance Policy. Such floater must insure loss to materials and equipment prior to acceptance by Board and must be on an ALL RISK BASIS with the policy written on a specific job site.

1.5.3.3.8 Disposition of Insurance Documents. One original certificate of insurance with all endorsements attached must be deposited with Board for each insurance policy required.

1.5.3.4 Termination of Obligation to Insure. Unless otherwise expressly provided to the contrary, the obligation to insure as provided herein shall not terminate until the Design Professional shall have executed the Certificate of Substantial Completion.

1.5.3.5 Failure of Insurers. The CMR is responsible for any delay resulting from the failure of his insurance carriers to furnish proof of proper coverage in the prescribed form.

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Part 6 – Hazardous Conditions and Materials

1.6.1 Hazardous Materials.

1.6.1.1 Definition.

1.6.1.1.1 The term "Hazardous Materials" shall mean any material or substance within the meaning and definition for "Hazardous Substance" and/or "Hazardous Waste" as those terms are employed and set forth in the Georgia Hazardous Site Response Act and the Comprehensive Environmental Response Compensation and Liability Act as amended, 42 USC § 6901 et seq., and regulations promulgated thereunder (collectively "CERCLA") and any corresponding state or local law or regulation, and shall also include: (a) any Pollutant or Contaminant as those terms are defined in CERCLA; (b) any Solid Waste or Hazardous Constituent as those terms are defined by, or are otherwise identified by, the Resource Conservation and Recovery Act as amended, 42 USC § 6901 et seq., and regulations promulgated thereunder (collectively "RCRA") and any corresponding state or local law or regulation; (c) crude oil, petroleum and fractions of distillates thereof and petroleum releases ; (d) any other material, substance or chemical defined, characterized or regulated as toxic or hazardous under any applicable law, regulation, ordinance, directive or ruling, including, but not limited to, asbestos or polychlorinated biphenyl (PCB),and, (e) any infectious or medical waste or environmental contamination as defined by any applicable federal or state laws or regulations.

1.6.1.1.2 The term "Hazardous Materials" does not include those materials that are expressly and specifically required to be installed under the Contract Documents.

1.6.1.1.3 The term "Hazardous Materials" does not include products or materials that are commonly used in construction or industrial practice so long as they are used in accordance with the manufacturer's instructions or Material Safety Data Sheets issued for the product or materials. (See Article 1.6.3 below.)

1.6.1.2 Obligation to Notify Board of Existing Hazardous Materials. The CMR shall immediately notify the Board and the Design Professional, both orally and in writing, of the presence and location of any physical evidence of, or information regarding the presence of Hazardous Materials at the Project Site of which it becomes aware. If the CMR encounters Hazardous Materials on the Project Site the CMR shall (i) immediately stop performance of Work or that portion of the Work affected by or affecting such Hazardous Materials; (ii) secure the contaminated area against intrusion; (iii) not disturb or remove the Hazardous Materials; (iv) not proceed, or allow any subcontractor or supplier to proceed, with any Work or other activities in the area affected by such Hazardous Materials until such materials have been properly remediated and until directed in writing to do so by the Board ; and, (v) take any other steps necessary to protect life and health and the surrounding environment. The CMR shall be entitled to adjustment of the Contract Time and the Contract Sum pursuant to the General Requirements in order to compensate for the impact of any required demolition, re-work, shutdown, delay, protection of work, disruption, and start-up resulting from the encountering of such Hazardous Materials on the Project site for which the CMR is not responsible.

1.6.1.3 Prohibition Against Selecting and Installing Products Containing Hazardous Materials. The CMR shall not select, install or otherwise incorporate any products or materials containing Hazardous Materials within the boundaries of the Project Site unless the products and materials are specifically required in the Contract Documents. Should the CMR or his subcontractors or material suppliers have knowledge that, or believe that, an item, component, material, substance, or accessory within a product or assembly selected by the CMR may contain Hazardous Materials, not in accordance with the definition set forth 1.6.1.1 above, it is the CMR's responsibility to secure a written certification from the manufacturer of any suspected material which identifies the specific Hazardous Material(s) contained, together with the Material Safety

Data Sheets (MSDS) for such materials. A copy of the written certification shall be submitted to the Board and Design Professional.

1.6.1.4 Fill, Backfill and Landscaping. No soil found on site, or transported to the site from remote locations, which contains debris or waste or Hazardous Materials shall be used for fill, backfill or landscaping topsoil.

1.6.2 Responsibility and Warranty of Trade Contractors, Trade Suppliers, and Subcontractors.

Products that are specified by reference standards or in descriptive manner without a manufacturer's name, model number or trade name, to be selected by the CMR, shall not contain Hazardous Materials in any form, except as and to the extent permitted in 1.6.1, above, and 1.6.3, below. The CMR shall require that each of his subcontractors and material suppliers warrants to the Board and Design Professional that all materials, products and assemblies, other than those which specifically and expressly required by the Contract Documents, incorporated, or submitted for incorporation into this Project, are free of Hazardous Materials. This warranty shall also include all materials, components, and accessories not specifically enumerated or detailed in the Contract Documents but which are required by performance specifications or recommended by manufacturers for complete installation of materials, products and assemblies.

1.6.3 Hazardous Materials and Substances Used On the Job Site.

Products containing Hazardous Materials may be employed in the performance of work by the CMR and its subcontractors, as allowed by subparagraph 1.6.1.1.3 above, as a means and methods application or as part of its performance of the Work, such as chemicals used on the job site, but only provided that: (i) such products are used in accordance with the manufacturer's instructions and Material Safety Data Sheets; (ii) such products are rendered harmless upon completion of the affected Work; (iii) reasonable precautions can be and are taken to prevent foreseeable bodily injury or death to persons involved in the Work or in its proximity, including the ultimate users of the completed Work; (iv) the CMR shall make available to the Board and the Design Professional copies of Material Safety Data Sheets (MSDS) for any such products used on the job site, and (v), the CMR shall immediately notify Board, Design Professional and appropriate regulatory agencies if there is a spill or release or misuse of any such product used on the job site that exceeds State or Federal reportable limits.

1.6.4 Hazardous Conditions.

The CMR and Board acknowledge that previously unknown hazardous conditions may be uncovered at any job site, and in particular where existing structures are being demolished and/or remodeled to accommodate new construction or to reutilize existing facilities. Should a hazardous condition not involving Hazardous Materials as set forth above be encountered on the project site, and should reasonable safety precautions be deemed by the CMR in good faith to be inadequate to prevent foreseeable personal injury to persons encountering the hazardous condition, the CMR shall, upon recognizing the hazardous condition, stop Work in the affected area and immediately report the hazardous condition to the Design Professional and Board in writing. The Board shall undertake, or shall contract (by Change Order) with the CMR or contract with a Separate CMR, to resolve the condition. So long as the hazardous condition did not result from activities or substances brought on the site by the CMR, the CMR is entitled to adjustments in the Contract Time and the Contract Sum as set forth in Paragraph 1.6.1.2 above.

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PART 7 – MISCELLANEOUS PROVISIONS.

1.7.1 Legal Compliance.

1.7.1.1 General. This Contract shall be governed by the law of Georgia. The CMR shall comply with all laws, rules, regulations, ordinances, and orders of any government agency, authority, instrumentality, political subdivision, municipality, or entity having jurisdiction in the performance of the Work, including but not limited to the Georgia Department of Education, and shall ensure the compliance of its Subcontractors. Contractor shall, at Owner's request, execute such forms as may be necessary for the Owner to comply with requirements of any state or government agency, such as Department of Education Form 0263, the Request for Reimbursement Form.

1.7.1.2 Specific Laws. Without limiting the generality of the foregoing Paragraph, the following laws are specifically referenced:

- 1.7.1.2.1 The Drug-Free Workplace Act, O.C.G.A. § 50-24-1, *et seq.*
- 1.7.1.2.2 Preference for Georgia Supplies, materials, equipment, and agricultural products,
O.C.G.A. §§50-5-60 through 61.
- 1.7.1.2.3 Standards and Requirements for Construction, Alterations, etc., O.C.G.A. § 8-2-1 *et seq.*
- 1.7.1.2.4 Control of Soil Erosion and Sedimentation, O.C.G.A. § 12-7.1, *et seq.*
- 1.7.1.2.5 Regulation of Fire and other Hazards, O.C.G.A. § 25-2-1 *et seq.*
- 1.7.1.2.6 Providing safe workplace, O.C.G.A. §§ 34-2-10 and 34-7-20
- 1.7.1.2.7 Georgia Facility Protection Act, O.C.G.A. § 25-9-1 *et seq.* (See Article E-12(f))
- 1.7.1.2.8 High Voltage Safety Act, O.C.G.A. § 46-3-30 *et seq.*
- 1.7.1.2.9 Access and Use by Physically Handicapped Persons, O.C.G.A. § 30-3-1 *et seq.*
- 1.7.1.2.10 Title VII of the Civil Rights Act, 42 U.S.C. § 2000a through 2000h-6
- 1.7.1.2.11 Age Discrimination in Employment Act, 29 U.S.C. § 621 *et seq.*; 42 U.S.C. § 6101 *et seq.*
- 1.7.1.2.12 Americans with Disabilities Act, 42 U.S.C. § 12101 *et seq.*
- 1.7.1.2.13 Federal Occupational Safety and Health Act, 29 U. S. C. § 651 *et seq.*
- 1.7.1.2.14 Federal Emergency Planning and Community Right-to-Know Act, 42 U. S. C. § 11001, *et seq.*
- 1.7.1.2.15 Georgia Open Records Act, O.C.G.A. §50-18-70 *et seq.*
- 1.7.1.2.16 Scaffolding and Staging Statute, O.C.G.A. §34-1-1 *et seq.*
- 1.7.1.2.17 Department of Labor Rules and Regulations, O.C.G.A. § 34-2-6 *et seq.*
- 1.7.1.2.18 Hazardous Chemical Protection and Right to Know Act, O.C.G.A. § 45-22-2 *et seq.*,

- 1.7.1.2.19 Retainage on Public Works Contracts, O.C.G.A. §13-10-80 *et seq.*
- 1.7.1.2.20 Regulation of Blasting Operations, O.C.G.A. § 25-9-1, *et seq.*
- 1.7.1.2.21 The Prompt Pay Act, O.C.G.A. 13-11-1 *et seq.* shall not apply to payments to the CMR by the Board.
- 1.7.1.2.22 Possession of a weapon on or within 1,000 feet of a school O.C.G.A. 16-11-127.1 *et seq.*
- 1.7.1.3 **Building Codes.** The following Building Codes, as approved by the Georgia Department of Community Affairs, shall be used. (See O.C.G.A. §8-2-20.) The Design Professional will designate any additional codes or special modifications in the Supplementary General Requirements.
- International Building Code with Georgia Amendments
 - International Fire Code, with Georgia Amendments
 - International Plumbing Code, with Georgia Amendments
 - International Mechanical Code, with Georgia Amendments
 - International Fuel gas Code, with Georgia Amendments
 - National Electrical Code, with Georgia Amendments
 - International Energy Conservation Code, with Georgia Supplements and Amendments
- 1.7.1.4 **Fire, Life Safety, and Accessibility Codes.** The following codes, in the versions approved by the Georgia State Fire Marshal/Fire Safety Commissioner and Department of Human Resources, shall be used. The Design Professional will designate any additional codes or special modifications in the Supplementary General Conditions.
- 1.7.1.4.1 Georgia State Life Safety Code (NFPA 101)
- 1.7.1.4.2 State Accessibility Codes (See O.C.G.A. §30-3-3)
- 1.7.1.4.3 Rules and Regulations of the Georgia Safety Fire Commissioner (See O.C.G.A. §§25-2-4,12)
- 1.7.1.4.4 Swimming Pool Permits and Regulations (See O.C.G.A. §31-45-3, Rules and Regulations Chapter 290-5-57)
- 1.7.1.4.5 Georgia State Minimum Standard Fire Prevention Code (International Fire Code, 2006 Edition), with Georgia Amendments (2007).
- 1.7.1.4.6 American National Standard Institute 1986 Edition.
- 1.7.1.4.7 Georgia Accessibly Code 120-3-20.
- 1.7.1.4.8 NFPA Standards as listed in the Rules and Regulations of the Safety Fire Commissioner, Chapter 120-3-3.
- 1.7.1.5 **Latest Edition.** The latest edition approved by the implementing agency of the regulations, rules, and codes listed in Paragraphs 1.7.1.3, and 1.7.1.4 above, with all amendments as of the date of execution of the Design Professional Contract, shall govern the installation of all Work and is adopted and incorporated into the Contract Documents and made a part thereof by reference. However, the drawings and specifications shall be adhered to in all cases where they call for quality of materials, quality of workmanship, or quality of construction which is equal to or in excess of the quality required by the above stated codes and Provided also: That there may be no variances from the drawings and specifications except to the extent that the said variances shall be necessary

in order to comply with the above stated codes. It shall be the responsibility of the CMR to familiarize himself with the requirements of the above stated codes. If there are any express requirements in the drawings or specifications that are at variance to the above stated codes, all changes in the Work necessary to eliminate or add to the said requirements and make the Work conform to the above stated codes shall be adjusted as provided in the Contract for changes in the Work.

1.7.1.6 Compliance with Federal and State Work Authorization and Immigration Laws. The CMR and all Trade Contractors, Subcontractors and consultants must comply with all federal and state work authorization and immigration laws, and must, as a material condition of this Contract, certify compliance with O.C.G.A. §13-10-91 in strict accordance with paragraph 22 of the Contract. The required Contractor's affidavit (Exhibit L) must be filed with the Owner at contract execution and shall become a part of this Contract. Required subcontractor affidavits must be obtained and maintained by the CMR as of the beginning date of this contract and the beginning date of each subcontract or consultant contract. A copy of each such verification shall be provided to the Board at the time the subcontractor or consultant is retained. State officials, including officials of the Board, retain the right to inspect and audit the Project Site and employment records of the CMR, its Trade Contractors, Subcontractors and consultants without notice during normal working hours until Final completion, and as otherwise specified by law and by Chapter 300-10-1 et seq. of the Rules and Regulations of the Georgia Department of Labor.

1.7.2 Surveys, Permits, and Regulations. The Board may furnish the following surveys, as appropriate, unless otherwise specified: a) Phase 1 Environmental, 2) property boundary survey, 3) initial geotechnical survey, 4) potentially a topographic survey, but not necessarily, and during construction provide, 5) existing utility survey, and 6) one or two control points and elevation benchmarks. Permits and licenses of a temporary nature necessary for the prosecution of the Work shall be obtained and paid for by the CMR. Permits, licenses, and easements for permanent structures or permanent changes in existing facilities shall be obtained and paid for by the Board unless otherwise specified. The CMR and its Subcontractors must pay any municipal or county occupational licenses, taxes, or fees, if any. The CMR shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the Work. If the CMR observes that the drawings or specifications are at variance with any such laws, ordinances, rules or regulations, he shall promptly notify the Board in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the Work. If the CMR performs any Work knowing it to be contrary to such laws, ordinances, rules or regulations without such notice to the Board, he shall bear all costs arising therefrom. Nothing in this paragraph shall be construed to impose design responsibility on the CMR except as noted in the Contract Documents.

1.7.3 Open Records Act. Board and Design Professional and CMR acknowledge and agree that all records of the project and the Work, including records of Subcontractors, are subject to the Georgia Open Records Act, O.C.G.A. §50-18-70 et seq., with particular attention being called to O.C.G.A. §50-18-70(a) regarding the records of private persons, firms, corporations, or other private entity engaged in performance of services or functions on behalf of a state agency, public agency or public office.

1.7.4 Use of Site. The CMR has a revocable license to come on, use, and perform Work upon the Premises, shall confine thereto his plant, his apparatus, the staging and storage of materials, the operations of his forces and the Work to limits indicated by law, ordinances, permits, or the Contract Documents, and shall not unreasonably encumber the Premises with his materials. The CMR shall not load or permit any part of the Work to be loaded with weight that will endanger its safety. The CMR shall enforce Contract requirements regarding signs, advertisements, fires, and smoking and shall remove from the Premises and properly dispose all trash and debris.

1.7.5 Utilities. Pending the extension and connection of permanent water, permanent gas, permanent sewer taps, and permanent electric power, the CMR shall obtain temporary water, temporary gas, temporary electric power, and provide sewage disposal at his own expense. In the absence of provisions to the contrary, the CMR shall pay for all utilities services until Material Completion has been achieved.

1.7.6 Royalties and Patents. The CMR shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Board harmless from loss on account thereof. The Board shall defend and be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified.

1.7.7 Separate Contracts. The Board reserves the right at any time and from time to time upon notice to CMR to perform, or cause to be performed by other CMRs, other work at the Site in connection with the development of the Project that is not contemplated hereby or that is contemplated hereby if the CMR and the Board shall be unable to agree upon a Change Order incorporating such work as Work of the CMR under this Contract. In either case, the Board shall assure that such personnel or CMRs do not cause any conflict with the Work of CMR. CMR shall afford the Board and other CMRs reasonable opportunity for the introduction, protection, and storage of material and equipment at the Site and the execution of work, and shall properly connect, if required by Contract Documents, and coordinate its work with theirs. If any work by the Board or its other CMRs increases CMR's costs or extends the time of performance, CMR shall be entitled upon timely claim to a Change Order for payment by Board of any reasonable costs actually incurred by CMR as a result thereof and to an extension of time for performance for such reasonable time as the Design Professional shall determine. CMR has no responsibility hereunder to certify the suitability or correctness of any work performed by Board's own personnel or other CMRs under direct contract with the Board. This Article also applies to installation of loose equipment and fixtures by the Board, SCCPSS, or a Separate CMR.

1.7.8 Local, Women and Disadvantaged Business Participation. Pursuant to Board Policy FG, Contractor shall make and document good faith efforts to maximize the utilization of qualified local, minority, and women business enterprises ("LMWBEs") as subcontractors, suppliers, and subconsultants in connection with the performance of this contract. Examples of ways that Contractor can maximize the utilization of LMWBEs are outlined in Board Policy FG. Throughout the performance of this Contract, the Board may, from time to time, require Contractor to report on its effort to maximize LMWBE involvement in the Project.

1.7.9 Employment of Georgia Citizens and Use of Georgia Products and Georgia Forest Products. Given that the Work provided for in this Contract is to be performed in Georgia, it is the wish of the Board that materials and equipment manufactured or produced in Georgia shall be used in the Work and that Georgia citizens shall be employed in the Work at wages consistent with those being paid in the general area in which the Work is to be performed. This desire on the part of the Board is not intended to restrict or limit competitive bidding nor to increase the cost of the Work; nor shall the fulfillment of this desire be asserted by the CMR as an excuse for any noncompliance or omission to fulfill any obligation under the Contract.

1.7.10 Interpretation of Contract Documents. The Contract Documents shall be construed neither against nor in favor of either party, but shall be construed in a neutral manner.

1.7.11 Counterparts. This Contract may be executed in multiple counterparts. All counterparts shall constitute one and the same instrument. One (1) counterpart of this Contract shall be delivered to the Board and one (1) counterpart to the CMR.

1.7.12 Forms and Specimens. The forms and specimens in Section 7 are incorporated by reference herein and shall be executed in substantial conformance as required or convenient in describing obligations under the Contract Documents.

1.7.13 Entire Contract. The Contract Documents referenced herein constitute the entire Contract between the Board and the CMR with respect to the Project and supersedes all prior negotiations, representations, and agreements. Except as set forth herein, there are no other promises, understandings, agreements, representations or warranties, oral or written, expressed or implied between the parties. This Contract may not be changed, modified, or terminated, in whole or in part, nor any provision waived except by Change Order.

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SECTION 2 – PRECONSTRUCTION PHASE

PART 1 – PRECONSTRUCTION PHASE SERVICES

2.1.1 General. The Basic Services to be provided during the Preconstruction Phase constitute the Preconstruction Phase services. Upon issuance of a Construction Order, the Construction Phase may commence before the Preconstruction Phase is completed, in which case both phases shall proceed concurrently. In any event, however, the Preconstruction Phase cannot extend beyond the execution of the GMP Change Order. By definition, all services provided after the execution of the GMP Change Order are Construction Phase Services and are included in the GMP.

2.1.2 Construction Preparation Period.

2.1.2.1 Requirement for Project Planning. No physical work will begin on the construction site until the receipt of a Proceed Order is issued by the Board. The Contract assumes that a Proceed Order will be issued in conjunction with the award of the Contract (Preconstruction Services) and each subsequent Construction Order and Guaranteed Maximum Price Change Order. Failure of the CMR to provide the necessary documentation for the issuance of a Proceed Order shall not entitle the CMR to any extension of time. If the initial Proceed Order for Preconstruction Phase services is not issued within (60) sixty days from the award of the Contract and non-issuance is due to non-performance by the CMR, the CMR may be in default.

2.1.2.2 Timing of Submission of Documents. No Proceed Order shall be issued until the Board has received, in good and proper order, including approval of Design Professional where required, the following documents. The documents shall be deemed submitted in accordance with the following schedule:

2.1.2.2.1 At Contract Execution and Prior to Commencement of Preconstruction Services:

- (a) Proof of Insurance as required by the Contract Documents
- (b) Payment bond for preconstruction services (See Article 2.1.12)

2.1.2.2.2 Prior to acceptance of the Initial Construction Order by Board:

- (a) The Construction Order executed by CMR and Design Professional
- (b) Payment and Performance Bonds in accordance with the Contract Documents
- (c) Proof of Insurance (specifically increased Builder's Risk Coverage)
- (d) Construction Management Plan as required in Section 2.1.3 including Security Program and Safety Program
- (e) Documentation necessary for receiving all land disturbance permits
- (f) CMR's Quality Control Program as required in Section 2.1.4
- (g) Construction Progress Schedule as required by Section 2.1.5 incorporating schedule of Construction Order(s)
- (h) CMR's Staffing Plan, Wage and Salary Schedule
- (i) List of Intended Trade Contractors, Subcontractors and Trade Suppliers
- (j) Submittal and Shop Drawing Schedule
- (k) CMR's Certificate of Subcontractor's Workers' Compensation and Employer's Liability Insurance as required in Sections 1.5.3.3.1 and 1.5.3.3.2
- (l) Subcontractors' Affidavit for Georgia Security and Immigration Compliance as required Section 1.7.1.6.

2.1.2.2.3 Prior to acceptance of all subsequent Construction Orders and Guaranteed Maximum Price Change Order, CMR shall supplement or amend all documents submitted under Section 2.1.2.2.

2.1.2.3 Endorsement to Payment and Performance Bonds

2.1.2.3.1 Construction Order.

(a) In the case of the initial Construction Order, payment and performance bonds furnished by the CMR in conformance with and in the form set forth in the Contract Documents designating the CMR as the principal obligor and the Owner as the obligee, in an amount of the Change Order Sum covering the Work under that Construction Order and, in the case of subsequent Construction Orders, an endorsement to such bonds increasing the aggregate amount of the bonds to an amount equal to the aggregate of the Change Order Sums of all Construction Orders to this Contract. If in connection with a Construction Order, the CMR has furnished payment and performance bonds in the amount approved by the Board as the reasonably expected aggregate amount of the Change Order Sums of that and any prior Construction Order and all subsequent Construction Orders and covering all such Work, then upon entry of a subsequent Construction Order, no additional endorsement to payment or performance bonds shall be required provided that the aggregate amount of the Change Order Sums of all Construction Orders does not exceed the penal sum of each bond. However, the Board may require written confirmation from the surety that the outstanding bonds cover the Work under a subsequent Construction Order. No election or failure of the Board to request such confirmation shall affect the rights of the board or there under the existing bonds covering such Work.

(b) As an alternative, the initial payment and performance bonds may be obtained with the penal amount set as the sum of the total CMR fees plus the total estimated construction cost at the time of the initial Construction Order.

2.1.2.3.2 Effect of GMP Change Order Upon Bonds. Upon approval of the GMP Change Order, payment and performance bonds shall be furnished by the CMR and in conformance with and in the form set forth in Contract Documents, in the amount of the Guaranteed Maximum Price, designating CMR as the principal obligor and the Board as the obligee. If in connection with a Construction Order preceding the GMP Change Order, CMR has furnished payment and performance bonds covering the Work under Construction Orders and under the GMP Change Order, and such bonds are in an amount not less than the Guaranteed Maximum Price, no additional payment or performance bonds shall be required. However, the Board may require written confirmation of the surety that the outstanding bonds cover the Work under the GMP Change Order. No election or failure of the Board to request such confirmation shall affect the rights of the Board or others under the existing bonds covering such Work.

2.1.3 Construction Management Plan. CMR shall prepare and furnish to the Board and Design Professional a thorough and complete plan for the management of the Project from issuance of the Proceed Order under the initial Construction Order through the issuance of the Design Professional's Certificate of Material Completion. Such plan shall include, without limitation, the CMR's staffing plan, an estimate of the manpower requirements for each trade and the anticipated availability of such manpower, a schedule prepared using the critical path method that will amplify and support the schedule required in Section 2.1.5 below. The CMR shall include in his plan the names and resumés of the Project Superintendent and Project Manager. The plan shall include, without limitation, the following:

2.1.3.1 Security Program. Develop and implement an effective security program for the Project Site, which program shall require the CMR and the Trade Contractors to take measures for the protection of their tools, materials, equipment, and structures. As between CMR and Board, CMR shall be solely responsible for security against theft of and damage to all tools and equipment of every kind and nature used in connection with the Work, regardless of by whom owned.

2.1.3.2 Safety Program. The CMR shall design and submit to the Board a specific safety program for the Work for the site(s). The CMR shall establish and require all Trade Contractors or Trade Suppliers to establish reasonable safety programs. The CMR shall also submit its standard monthly safety reports to the Board and Design Professional. No imposition of responsibility on the CMR for safety under this Contract shall relieve any Trade Contractor of its responsibility for safety of persons or property on or near the Project Site. The CMR shall include in his plan the names of the persons in charge of Safety.

2.1.3.3 Certificate of Competency – Fire Protection Trade Contractor. If a fire protection sprinkler system is required, the CMR shall submit to the Board and Design Professional the certificate of competency of the fire protection sprinkler system Trade Contractor as required by State of Georgia Fire Protection and Safety Code. The certificate of competency shall be provided prior to any work being performed on the fire protection sprinkler system.

2.1.4 Quality Control Program.

2.1.4.1 Responsibility for Quality of Materials and Installation. CMR acknowledges that it has full, total, and complete responsibility for providing materials, labor, and all other items necessary for providing the level of quality specified in the Contract Documents. CMR agrees that this responsibility is indivisible, non-delegable, non-transferable, and not diminished by any inspections provided by the Design Professional or his consulting engineers, nor by any inspections provided by the Board. In recognition of this, CMR will prepare for submission and review by the Design Professional, a written program describing the efforts that will be taken to insure the proper quality level is achieved. The program shall be submitted prior to the issuance of a Proceed Order.

2.1.4.2 Written Program. CMR's written Quality Control Program shall describe in detail the steps the CMR will take to ensure quality and will include, without limitation, those personnel, in addition to the Project Manager and Superintendent, who will provide review and verification of the proper installation of the Work. Each Subcontractor having responsibility for more than \$100,000 of the contract cost, shall be addressed in the plan. The written program shall include affidavits from each of the involved Subcontractors acknowledging their responsibilities under the Contract in general and the Quality Control Program specifically.

2.1.5 Scheduling Requirements.

2.1.5.1 Scheduling Objectives Relative to Design. With the Design Professional, coordinate and integrate the Design Professional's design efforts with CMR's anticipated preconstruction services. The coordination shall include identification of (i) the Components of the Project (a) for which existing portions will be separated for incorporation into a Construction Order or (b) for the description of specific components of the Work by a Construction Order so as to permit the immediate commencement of construction services or to facilitate the sequence of construction to further and without affecting the Board's basic objectives, (ii) the sequence in which such Component Construction Documents will be prepared or separated, and (iii) a schedule for completion of such Component Construction Documents that includes the necessary timing for the release of drawings and specifications as needed to support anticipated construction.

2.1.5.2 Construction Progress Schedule; Overall Project Schedule. The CMR shall submit for review by the Design Professional and approval by the Board a Construction Progress Schedule based upon the Design Professional's Preliminary Design and Construction Schedule and prepared using a CPM (Critical Path Method) process, within sixty (60) days after the Effective Date of the Contract, utilizing a full-featured software package in a form satisfactory to the Design Professional and Board, showing milestone dates for receipt and approval of Component Construction Documents and Contract Documents, critical design coordination meetings, submittal of Construction Orders, submittal of the GMP Change Order, preparation and processing of shop drawings and samples, and delivery of materials or equipment requiring long lead-time procurement, Board's occupancy requirements and Proposed Date of Material Completion. It should also include the dates for commencement and completion of the Work required by the Contract Documents, including coordination of mechanical, plumbing, and electrical disciplines, as well as coordination of the various subdivisions of the Work within the Contract. Milestones must be clearly indicated and sequentially organized to identify the critical path of the Project. The Construction Schedule will be developed to represent the CSI specification divisions. It shall have the minimum number of activities required to adequately represent to the Board the complete scope of Work and define the Project's (and each Component's) critical path and associated activities.

The format of the Construction Progress Schedule will have dependencies indicated on a monthly grid identifying milestone dates such as construction start, phase construction, structural top out, dry-in, rough-in completion, metal stud and drywall completion, equipment installation, systems operational, inspections for Material Completion, the Material Completion Date and the Final Completion Date. The CMR shall submit, along with the Construction Progress Schedule, the Submittal Schedule for approval by the Design Professional, correlating the associated approval dates for the documents with the Construction Progress Schedule. Upon recommendation by the Design Professional and approval by the Board, the Construction Progress Schedule shall become the Overall Project Schedule, which shall be utilized by the Design Professional, Board and CMR. The CMR must provide the Design Professional and the Board with monthly updates of the Overall Project Schedule indicating completed activities and any changes in sequencing or activity durations, including approved change orders.

2.1.5.3 Progress Reports and Information. When required, the CMR shall submit to the Design Professional and Board such schedule of quantities and costs, payrolls, bills, vouchers, correct copies of all subcontracts, statements, reports, correct copies of all agreements, correspondence, and written transactions with the surety on the performance bond that have any relevance to the Work, estimates, records, and other data as the Board may request that concerns the Work performed or to be performed under this Contract. When requested by the Board, the CMR shall give the Board access to its records relating to the foregoing. (See also Section 4.1.2, Audits.) The above reports shall include, but are not limited to, (a) written notice of dates by which specified Work will have been completed, (b) written notice of dates by which Non-Compliant Work will be made good, (c) written notice that Non-Compliant Work has been made good, (d) written notice as to the date or dates by which Work that has not been performed with equal steps and at the same rate required by the Overall Project Schedule shall have been brought into conformity with the Overall Project Schedule, (e) date by which any undisputed claim of a Subcontractor supplier, or laborer shall have been paid, (f) written advice regarding the nature and amount of any disputed claim of a Subcontractor, supplier, or laborer, and (g) information regarding Work performed under Change Orders.

2.1.6 CMR Design Coordination Activities.

2.1.6.1 Local Conditions. The CMR shall visit the site(s), become familiar with the local conditions, and correlate observable conditions with the requirements of the Contract Documents.

2.1.6.2 Design Coordination Meetings and Review. Utilizing its own review and matters discussed at Design Coordination Meetings, CMR shall appropriately review the Program and Construction Documents at reasonable intervals agreed to by the Board, Design Professional, and CMR, in accordance with the schedule as they are being prepared and are made available by the Design Professional until the Construction Document Change Order (100% documents) is approved. (See also Section 2.2.2.) The principle objectives of the construction document review process are the recommending of alternative solutions whenever such matters affect cost, construction feasibility or schedule without the CMR, however, assuming any of the Design Professional's responsibilities for design. The CMR should consider life-cycle costs, value engineering analyses and other studies to recommend changes or modifications thereof that will reduce the cost of the Project without reducing quality, or will expedite its completion, or that, in the judgment of the CMR, may otherwise be in the best interest of the Board. As the Construction Documents progress to completion, the CMR is the principle Project Team member positioned to identify conflicts, omissions, or constructability issues in the documents.

2.1.6.3 Recommendations on Phasing of Components. CMR shall make recommendations to the Board and to the Design Professional regarding the division of the Work in the design documents and revisions to facilitate the development of Components of the Work related to the Project, the selection and awarding of Trade Contracts and Trade Suppliers, taking into consideration such factors as estimated cost of the Work, time of performance, the availability of labor, long lead-time items, overlapping trade jurisdictions, provisions for temporary facilities, and the reduction of areas of conflict and overlapping in the Work to be performed by CMR or by Trade Contractors.

2.1.6.4 Additional Activities. The CMR shall consult with the Board and Design Professional regarding site use and improvements, as well as the selection of materials, building systems and equipment. The CMR shall provide recommendations designed to minimize adverse effects of labor or material shortages; time requirements for procurement, installation of equipment, and factors related to construction cost, including estimates of alternative designs or materials, and other possible economies.

2.1.7 Building Commissioning Services. The Board may provide either through: (i) a separate contract, (ii) as an additional service of the Design Professional, (iii) Construction Order to the CMR, or (iv) as a separate contract issued by the Board, the Building Commissioning services involving the project's HVAC and exhaust systems, temperature control systems, fire detection and alarm systems, emergency power and lighting system, fire suppression system, security locks and security locking control systems, food service equipment (if applicable), and laundry equipment (if applicable) and other services. It is the intent of this Section that the Commissioning Authority engaged for this Project enforce the requirements mentioned herein and certify that the systems and equipment listed all function properly prior to Material Completion.

2.1.7.1 Initial Building Commissioning Plan. The Board shall develop with the CMR and the Design Professional, an initial Building Commissioning plan to consist of the following:

2.1.7.1.1 The Building Commissioning Plan shall include a summary of understanding of the design intent for each of the relevant building systems and equipment. Each design intent summary shall establish critical performance criteria that indicates whether a system is properly functioning.

2.1.7.1.2 The Building Commissioning Plan shall include a commissioning schedule listing the duration of each commissioning activity such as system and equipment manual submittal and approval, equipment start-up, and system and equipment training, and combining all such activities in a manner reflecting the inherent subsidiary relationships between activities. This schedule shall be used as a basis for accomplishing the commissioning portion of the Overall Progress Schedule.

2.1.7.2 Define Duties. The CMR, in coordination with Board, shall during preparation of the Contract Documents clearly define all duties and activities required of the various Trade Contractors relating to Building Commissioning, any necessary order in which these activities and duties must take place, and define all critical performance criteria to be achieved.

2.1.7.3 Inspect, Review and Monitor. The CMR's Commissioning Authority shall inspect, review and monitor all Building Commissioning related construction activities for timeliness, completeness and conformance with the criteria established by the contract documents, and report same to the CMR, Board and the Design Professional. The CMR's, it's Commissioning Authority and the Board shall coordinate and supervise the training activities of each system.

2.1.8 CMR Cost Responsibilities.

2.1.8.1 Cost Estimates and Constructability Reviews. When the Board has sufficiently identified the Project requirements and criteria, and the Project Design Professional has prepared other basic design criteria, CMR shall prepare for the review by the Project Design Professional and approval of Board preliminary construction cost estimates using area and volume or similar conceptual estimating techniques. During the preparation of the design, the CMR shall update and refine this estimate at appropriate intervals agreed to by the Board, Design Professional, and CMR.

2.1.8.1.1 Construction Cost Estimates. Prepare Construction Cost Estimates setting forth in detail CMR's estimate of construction costs, including all Actual Costs and CMR Contingency and Fees, at each stage of the design and for the construction of the Project and each Component thereof. Such estimates shall include the cost of safety factors. Such

Construction Cost Estimates shall be prepared and updated continually as construction documents are developed and shall be formally submitted to the Design Professional and the SCCPSS Representative when each Construction Order is issued or at such more frequent intervals as Board may reasonably request.

2.1.8.1.2 Reconciled Construction Cost Estimates. Provide to the Board reconciled Construction Cost Estimates, consisting of a composite of the separately derived Design Professional's current Statement of Probable Construction Cost and the CMR's Construction Cost Estimate, each based upon the Program and design documents prepared by the Design Professional. Reconciled Construction Cost Estimates shall be prepared at the conclusion of Schematic Design Phase, at the conclusion of the Design Development Phase, when Construction Documents are approximately 50% complete and prior to the submission of the Guaranteed Maximum Price Proposal. If at any time the Design Professional's current Statement of Probable Construction Cost and the Construction Cost Estimate of the CMR are, in the CMR's judgment, not reconcilable or exceed corresponding components of the Project Budget, the Board, the Design Professional and the CMR shall confer to resolve such differences and, if such differences cannot be resolved, the CMR shall make such recommendations to the Board as CMR may deem necessary or appropriate to resolve such differences. If any estimate submitted to Board exceeds previously approved estimates or the Construction Cost Estimate in the Development Budget, CMR shall make appropriate recommendations as to alternatives to reduce the Construction Cost Estimate or other project costs through value engineering without reducing quality, reduction of cost through re-sequencing the job or reducing the construction time, and/or program reduction, or other cost saving recommendations to the Board and Design Professional.

a. Schematic Design. Within twenty-five (25) calendar days after the Schematic Design documents have been prepared by the Project Design Professional and approved by the Board, CMR shall prepare for the review by the Project Design Professional and approval by the board of a more detailed construction cost estimate with supporting data. During the preparation of the Design Development documents, CMR shall update and refine this estimate at appropriate intervals agreed to by the Board, Design Professional, and CMR.

b. Design Development. Within twenty-five (25) calendar days after the Design Development documents have been prepared by the Project Design Professional and approved by the Board, CMR shall prepare a more detailed construction cost estimate with supporting data for review by the Project Design Professional and approval by the Board.

c. Construction Documents. During the preparation of the Construction Documents, CMR shall update and refine this estimate at appropriate intervals agreed to by the Board, Design Professional and CMR.

d. Cost Exceeds Previous Estimate. If any estimate submitted to the Board exceeds previously approved estimates or the Construction Cost Estimate in the Development Budget, CMR shall make appropriate recommendations to the Board and Design Professional.

2.1.8.2 Rental Rates and Wage Rates for Change Orders. As soon as practical, but prior to the completion of the Preconstruction Services and in any event prior to the commencement of any Work on the Site, the CMR shall submit in accordance with the style and format of a specimen to be furnished by the Board the following: (1) a proposal for rental rates on heavy construction equipment that shall apply in the event Change Order Work is performed, and (2) a proposal for wage rates for the types of project labor that shall apply in the event of the execution of any Change Order Work. Under penalty of false swearing, a principal of the contracting firm shall certify that the proposal for rental rates and proposal for wage rates do not exceed current costs for like services. The Board will in no event consider a rental rate in excess of eighty percent of the rate set forth in the latest edition of the "Compilation of Nationally Averaged Rental Rates for Construction Equipment" of the Associated Equipment Distributors unless the rates proposed in

excess of eighty percent (80%) are supported by proof satisfactory to the Board that the excess rates are reasonable. If the equipment is owned by the CMR the costs shall be charged at a maximum of eighty percent (80%) of market monthly rental rates for the amount of time used. If applicable, transportation costs may be included. The decision of the Board shall be final, binding and conclusive on all parties. Rental rates shall be payable only for the actual time the equipment is required on the Site.

2.1.8.3. Unit Prices.

2.1.8.3.1 During Preconstruction. Prior to the completion of the Preconstruction phase, the CMR shall establish with the Board Unit Prices not already set. Examples include additional installation of stormwater management BMPs, any other anticipated Change Order Work that can utilize Unit Prices, or for any items of Work considered necessary by the Design Professional and not established in the Contract Documents.

2.1.8.3.2 During Construction. Upon request of the Board, the CMR shall submit written proposals for unit prices to be applied in the event Change Order Work is authorized by the Board to be performed under Section 3.4.7.2.

2.1.8.3.3 Calculation of Unit Prices. Unit Prices include all sums to be paid to the CMR for this Work and includes all direct costs, indirect costs, consequential costs, markups and fees. The CMR shall certify that the Unit Prices submitted do not exceed current costs in the industry or trade for like services or materials.

2.1.9 Limitation of Scope. The CMR acknowledges and agrees that the Contract Documents are addressed to skilled tradesmen in the construction profession who shall be required to use their special skills and experience, through submittals and shop drawings, to translate the Design Professional's design intent as expressed in the Contract Documents into a completed structure. The Contract Documents shall specify when shop drawings or submittals require the seal of a specialty consultant. Nothing herein shall be deemed to permit the CMR to require of the Design Professional any services that the Board is not authorized to require under the terms of the Architectural Contract between the Board and the Design Professional. Nothing herein shall be deemed to impose upon the CMR any responsibilities to provide any services constituting the practice of architecture, engineering, or any licensed design profession. CMR shall exercise skill and judgment in the performance of its construction management services, but does not warrant or guarantee the advice or recommendations furnished with respect to design and does not control, warrant or guarantee any design services performed or furnished by the Design Professional.

2.1.10 Extent of Responsibility. The CMR does not warrant or guarantee estimates and schedules except as may be included as part of the Guaranteed Maximum Price. The recommendations and advice of the CMR concerning design alternatives shall be subject to the review and approval of the Board and the Board's professional consultants.

2.1.11 Long Lead-Time Items. The CMR shall recommend to the Board and Design Professional a schedule for procurement of long lead-time items that will constitute part of the Work as required to meet the Project schedule. If such long lead-time items are procured by the Board, they shall be procured on terms and conditions acceptable to the CMR. Upon the Board's acceptance of the CMR's Guaranteed Maximum Price proposal, all contracts for such items shall be assigned by the Board to the CMR, who shall accept responsibility for such items as if procured by the CMR. The CMR shall expedite the delivery of long lead-time items.

2.1.12 Payment Bond for Preconstruction. If the Preconstruction Fee (Section 4, Part 1) and the Preconstruction Costs and Expenses (Section 4, Part 2) exceed \$100,000.00, the CMR will furnish a Payment Bond with a penal sum equal to or greater than the total of the Preconstruction Costs and Expenses and the Preconstruction Fee. The bond will be provided prior to beginning providing any preconstruction services.

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PART 2 – CONSTRUCTION DOCUMENTS AND SITE PLAN

2.2.1 General Provisions Regarding Construction Documents.

2.2.1.1 Familiarity with Contract Documents. CMR represents that it has reviewed or will review and become familiar with the existing Contract Documents, not later than the commencement of the preconstruction phase.

2.2.1.2 Identification of Construction Documents. The Design Professional shall identify the Construction Documents, which shall include, but are not limited to, the Specifications, the Drawings, and all Addenda. The Construction Documents are included within the Contract Documents.

2.2.1.3 Correlation and Intent. It is the intention of the Board, Design Professional, and CMR that the Construction Documents include all items necessary for proper execution and full and final completion of the Work. The Contract and Construction Documents (the Contract Documents) are complementary, and what is required by one is as binding as if required by all. Performance by the CMR is required to the extent consistent with and reasonably inferable from the Contract Documents as being necessary to produce the design intent as expressed in the Contract Documents. The intention of the Board and the Design Professional is that the Contract and Construction Documents include all labor and materials, equipment, and transportation necessary for the proper execution of the work. It is not intended, however, that materials or work not covered by or properly inferable from any heading, branch, class, or trade of the specifications shall be supplied unless noted on the drawings.

2.2.1.4 Arrangement of Specifications. The Specifications are separated into numbered and titled divisions for convenience of reference. Neither the Board nor the Design Professional shall assume any responsibility for defining the limits of any subcontracts on account of the arrangement of the Specifications. Notwithstanding the appearance of such language in the various divisions of the Specifications as, "The Plumbing Contractor," "The Electrical Contractor," "The Roofing Contractor," among other divisions, the CMR is responsible to the Board for the entire Contract and the execution of all of the Work referred to in the Contract Documents. No partial sets of Bidding Documents shall be issued by the Design Professional. Any partial documents issued by the CMR shall be the responsibility of the CMR.

2.2.1.5 Conflicts. The following general principles shall govern the settlement of disputes that may arise over conflicts in the Contract Documents: (a) as between figures given on drawings and the scaled measurements, the figures shall govern; (b) as between large-scale drawings and small-scale drawings, the larger scale shall govern; (c) as between the Contract and the Specifications, the requirements of the Contract, as executed, shall govern. Conflicts noted shall be reported to the Design Professional. The principles set forth herein shall not alter the provisions of Section 1.1.7.1. Schedules, lists, indexes, tables, inventories, written instructions, written descriptions, summaries, statements, classifications, Specifications, written selections, or written designations, although appearing on the drawings, are deemed to be and are Specifications.

2.2.1.6 Requests for Information (RFI). In the event the Construction Documents are not complete, definite, and clear to skilled tradesmen in the construction professions, or appear to have conflicting information, the CMR shall request the Design Professional in writing for additional instructions and shall furnish the Board or Program Manager a copy of the RFI. With reasonable promptness but not more than five days thereafter, the Design Professional shall furnish complete, definite, and clear instructions in writing, or by means of drawings, or both. In the event such additional instructions are given orally for expediency, they shall be confirmed in writing or by drawings or both within five days following the oral instructions. Any such additional instructions shall be consistent with the Contract Documents and reasonably inferable therefrom. The Work shall be executed in conformity with the aforesaid instructions. The Design Professional shall furnish the Board a copy of all additional instructions issued to the CMR. If, because of events beyond its reasonable control, the Design Professional is not able to meet the specified time period, then it is entitled to ask for additional time from the Board.

2.2.1.7 Effect of Instructions, Bulletins, and Change Orders. No special implication, interpretation, construction, connotation, denotation, import, or meaning shall be assigned to any provision of the Contract Documents because of changes created by the issuance of any (1) Instructions, (2) Bulletin, or (3) Change Order other than the precise meaning that the Contract Documents would have had if the provision thus created had read originally as it reads subsequent to the (1) Instructions, (2) Bulletin, or (3) Change Order by which it was created.

2.2.1.8 Intellectual Property Rights in Construction Documents, Drawings, and Models. The drawings, Specifications and other documents prepared by the Design Professional pursuant to this Contract (including, without limitation, the Construction Documents), are the property of the Board, whether or not the Project for which they are made commences or completes construction. Neither the CMR nor any Subcontractor or material or equipment supplier shall own or claim a copyright in such drawings, Specifications, and other similar or related documents; Board shall retain all common law, statutory, and other intellectual property rights with respect thereto. The CMR must deliver remaining copies of such documents to the Board upon request or upon completion of the Work, except that the CMR may keep one copy of such documents for its files. The CMR shall only use such drawings, Specifications and other documents for this Project. Neither the CMR nor any Subcontractor or material or equipment supplier may use such drawings, Specifications, and other documents on other projects without the specific written consent of the Board. All models are the property of the Board .

2.2.2 Documents at the Project Site.

2.2.2.1 Drawings and Specifications at the Project Site. The CMR shall keep at the Site at least one copy of the Contract Documents and Change Orders, all in good order and available to the Design Professional and to his representatives.

2.2.2.2 Design Coordination Responsibilities for Construction Documents. The CMR shall continue its design coordination activities, as a part of its Basic Services, for the duration of construction activities at the Site. In this regard, the CMR is the principal Project Team member in the position to accomplish, and is charged with, the receiving, assembling, and coordinating the construction documents as component construction documents, bulletins, addenda, Change Orders, RFI's, Requests for Interpretation, and responses to Submittals are issued. The CMR shall use its best efforts to perform a design documents coordination role with regard to constructability and conflicts, including but not limited to the following:

2.2.2.2.1 Review of Documents Providing or Affecting Design. The CMR shall examine all design related documents as they are received from the Design Professional in relation to the documents previously received and maintained on the Site. The review shall encompass the effect upon constructability of the Component or portion of the Project addressed in the new document, and in particular shall look for conflicts and inconsistencies with the previous documents. It is the Board's desire that this review be accomplished as early in the Project as practicable so that any conflicts or interpretations can be addressed in time to minimize impacts upon the Overall Project Schedule.

2.2.2.2.2 Annotation of Potential Conflicts. When potential conflicts affecting constructability are identified, the Construction Documents maintained at the Site shall be annotated, a Request for Information (RFI) or Change Order request, as appropriate, shall be promptly prepared and forwarded to the Design Professional, with a copy to the Board and Program Manager, if retained. The CMR shall maintain a log of these activities and the responses received from the Design Professional.

2.2.2.2.3 Identification of Potential Conflicts by Others. When a Subcontractor or Separate Contractor or other person identifies a potential conflict affecting constructability, the CMR shall undertake the review and effort outlined in Section 2.2.2.2 and its subparts to reach its own conclusion with regard to constructability in the same manner as if the potential conflict had been identified by the CMR itself.

2.2.2.2.4 Design Coordination Meetings. The CMR shall call for a design coordination meeting when one or more matters of potential conflict materially affect the sequencing or accomplishment of the Work, or may have an adverse impact upon the Overall Project Schedule.

2.2.2.2.5 CMR Responsibility. Notwithstanding the foregoing, it is the CMR's responsibility to identify potential conflicts and to participate in recommending methods of construction to facilitate a constructible solution, while it remains the Design Professional's responsibility to provide the design or interpretation necessary to resolve any actual conflict.

2.2.2.2.6 Design Professional Responsibility. Notwithstanding the foregoing, it remains the Design Professional's responsibility to produce fully coordinated Construction Documents. It is the Board's strong desire in this subparagraph to utilize all of the design and construction professionals on the Project Team to each professionals' best ability in order to foster effective and accurate communication of the design to the CMR and to the skilled tradesmen and subcontractors who are to construct the Project.

2.2.2.3 Recording Changes. The CMR shall record all changes and shall annotate a copy of the drawings to reflect the as-built condition in order to produce, at Final Completion, the Marked-up Construction Documents required by Section 6, Part 2.

2.2.3 Completion of Construction Documents For Acceptance of the GMP Change Order.

2.2.3.1 Construction Documents. The Board shall cause the Design Professional to prepare and shall approve Construction Documents (Working Drawings and Specifications) in accordance with the assumptions set forth in the proposed GMP Change Order. CMR shall provide advice to the Design Professional and the Board during the development of Construction Documents so they are prepared in accordance with the Construction Documents Schedule as set forth in the proposed GMP Change Order, and reflect the assumptions set forth in the proposed GMP Change Order. The CMR shall recommend alternative solutions benefiting the Board by reducing construction time, saving construction costs without reducing quality, or enhancing the quality of the Project.

2.2.3.2 Proposed Construction Document Change Order. Upon completion of complete Construction Documents consistent with the Board's Program and compliant with the assumptions stated by the CMR in the GMP Change Order, if executed, the Design Professional shall issue completed Construction Documents concurrently to the Board, for Board's review, and to the CMR for the preparation of the Proposed Construction Document Change Order. If the completed Construction Documents are acceptable to the CMR, the CMR shall promptly and within thirty (30) days prepare the Proposed Construction Documents Change Order, obtain the Design Professional's concurrence for acceptance and forward to the Board for approval. The Board shall review and approve or reject the Proposed Construction Documents Change Order pursuant to Board Policy FGG. If the submitted final Construction Documents are not sufficient for the CMR to prepare the Proposed Construction Documents Change Order, CMR shall give notice within fourteen (14) days to the Board and to the Design Professional identifying the deficiencies.

2.2.3.3 CMR's Final Construction Documents Coordination Review. Prior to the Board's acceptance of the Proposed Construction Document Change Order and periodically during the Preconstruction Phase, CMR shall conduct reviews of the Construction Documents referenced therein for the purposes of recommending to the Board and the Design Professional any changes or modifications thereof that will reduce the cost of the Project without reducing quality, or will expedite its completion, or that, in the judgment of the CMR, may otherwise be in the best interest of the Board. However, the Board shall not be required to accept any such recommendations. The CMR shall also give notice to the Board and to the Design Professional of any errors, inconsistencies, or omissions (including non-conformance with applicable laws, statutes, building codes, rules and regulations) it may discover in the Construction Documents prior to acceptance by the Board of the Proposed Construction Document Change Order. This review function being a part of the Basic Services, the CMR will receive no additional payments or compensation for its review and recommendations. After acceptance by the Board of the Construction Document

Change Order, CMR shall be entitled to additional compensation pursuant to Section 3, Part 4 for changes in the work that result from coordination, errors or omissions in the documents, changes due to unforeseen conditions at the site, or changes required by governmental regulatory agencies. CMR shall not, however, be liable for any damages resulting from the failure of the Construction Documents to comply with said laws, statutes, building codes, rules, and regulations unless it recognizes same and performs a construction activity knowing it is contrary to same without providing advance written notice of same to the Board. CMR shall also give notice of any inconsistencies, conflicts, or omissions between said Construction Documents and either (i) the Program and revisions thereto by prior Construction Document Change Orders or (ii) the assumptions set forth in the GMP Change Order that were relied upon by CMR in the preparation of the GMP Change Order, including observed inconsistencies, conflicts or omissions between the Construction Documents and any proposed design development of such assumptions.

2.2.3.4 Rejection of the Construction Document Change Order. If the Construction Documents referenced in a proposed Construction Document Change Order are not true developments of the assumptions set forth in the GMP Change Order relied upon by CMR in the preparation of the GMP Change Order, as specified therein (other than variances due solely to differences in Actual Costs versus estimated costs) and as a result of such variance the performance of the Work described therein will increase the Estimated Cost amount as stated in the GMP Change Order, or will require an extension of the time for Material Completion as stated in the GMP Change Order, the CMR may reject the proposed Change Order and give notice of same to the Board and the Design Professional setting forth the basis for its rejection of same and stating a proposed increase in the GMP Change Order and its various Components, including, if applicable, the Date for Material Completion, under which the CMR would accept said Change Order. Following consultations with the Design Professional and CMR, the Board shall (i) require the Design Professional, without charge against the GMP Change Order, or its various Components, to revise the Construction Documents so as to make them true developments of the drawings, specifications and other documents relied upon by CMR in the preparation of the GMP Change Order, with said revisions to be completed within ten (10) days; (ii) accept the CMR's proposed increase in the GMP Change Order and its specified Component(s), including, if applicable, the Date for Final Completion; or (iii) direct CMR to proceed with the Work in accordance with the proposed Construction Documents. In the event CMR is directed to proceed with the Work in accordance with the proposed Construction Documents, under (iii) above, CMR shall be entitled to assert a claim in accordance with Section 5 Part 2 against Board for an increase in the GMP Change Order, including, if applicable, an extension of the Date for Material Completion, provided that such claim by CMR is asserted within fourteen (14) days after CMR is directed to proceed. If the CMR shall accept any proposed Change Order without notice as required by this Paragraph, then no claim shall thereafter be made by CMR that the Construction Documents identified therein are not true developments of the assumptions set forth in the GMP Change Order relied upon by CMR in the preparation of the GMP Change Order, and as specified therein.

2.2.3.5 CMR's Option for Redesign of Construction Documents. Prior to acceptance of any proposed Construction Document Change Order adding Construction Documents to this Contract, if the CMR gives notice to the Board that either (i) the lowest responsible proposal received by the CMR from a Trade Contractor to perform the Work described in the Construction Documents exceeds the CMR's budget for that Work as set forth in the Construction Budget, or (ii) that no responsible proposal for that Work has been received, then the CMR may request a redesign of the Construction Documents pertaining to said Work so long as the redesign is a functional and quality equivalent of the Work forming the basis of the GMP Change Order. The approval of such request for redesign shall be within Board's sole and absolute discretion. The architectural fees and costs for a requested redesign that is approved by Board shall be paid by the Board to the Design Professional and such payment shall be deducted from the Construction Contingency Component of the GMP Change Order. The deduction shall not alter the obligation of CMR under the GMP Change Order to perform the construction of the Project within the Guaranteed Maximum Price and any delays resulting therefrom shall not be a basis for an extension of the Date for Material Completion. If such redesign has been made once at the request of the CMR pursuant to this Paragraph, the CMR shall not request any further redesign with respect to the Construction Documents covered by that proposed Construction Document Change Order.

2.2.3.6 Failure to Reject within Time Limits. CMR's failure to reject the proposed Construction Document Change Order within the time limitations stated herein shall be deemed to evidence CMR's acceptance of same without any claim of variance.

2.2.4 Special Situation – New Sole Source Designation.

2.2.4.1 Limitations. This Section 2.2.4 applies only to Construction Documents referenced in a proposed Construction Document Change Order that designate a Sole Source that was not designated in the documents on which the GMP was based. Except as stated in this Paragraph, CMR's inability to obtain payment and performance bonds from Trade Contractors or warranties from Trade Contractor or Trade Suppliers as required under this Contract shall not otherwise excuse CMR from its bonding and warranty obligations under this Contract.

2.2.4.2 Sole Source as Grounds for Rejection of Construction Document Change Order. If after the acceptance of the GMP Change Order and during the preparation of a proposed Construction Document Change Order if said Construction Documents designate a "Sole Source" (as defined herein) from which CMR is required to procure goods or services necessary to perform the Work, which sole source has not been designated previously, CMR shall, in addition to the grounds enumerated above, be entitled to reject the proposed Construction Document Change Order if (1) the designated Sole Source is a Trade Contractor and it refuses to provide to CMR performance and payment bonds for the Trade Contract Sum in substantially the form set forth in Section 7; or (2) the designated Sole Source is a Trade Contractor or Trade Supplier and it refuses to provide CMR warranties required under this Contract, including any warranty required by Construction Documents referenced in the proposed Construction Document Change Order. In such event, CMR shall give written notice to the Board rejecting the proposed Construction Document Change Order and shall accompany said written notice with a proposal from CMR for changes or modifications in the referenced Construction Documents so as to eliminate the Sole Source designation but to achieve goods or services equal in quality or function. The Board shall then require the Design Professional to revise the subject Construction Documents so as to eliminate the designation of the Sole Source by incorporation of CMR's proposal or otherwise. Upon revision of the Construction Documents by the Design Professional and approval thereof by the Board, the CMR shall again prepare a proposed Construction Document Change Order for the purpose of adding the revised Construction Documents to this Contract.

2.2.4.3 No Excuse Without Notice. If CMR accepts a proposed Construction Document Change Order adding Construction Documents to this Contract that designate a Sole Source (without putting the Board on notice under this Section), CMR shall not be excused from its obligations with respect to the described Work by reason of the refusal of a designated Sole Source to provide payment or performance bonds to CMR or its refusal to provide warranties as required under this Contract.

2.2.4.4 Meaning of Sole Source. As used in this Section 2.2.4, "Sole Source" means a Trade Contractor or Trade Supplier specified by name in Construction Documents as the exclusive source from which conforming goods or services may be obtained. Designation of goods or services by reference to a named source accompanied by the qualification "or equal" or similar language is not a designation of a Sole Source as that term is defined herein.

2.2.5 Submittals. Submittals required by the Contract Documents shall be prepared specifically for the Work by the CMR to illustrate some portion of the Work. Submittals are not Contract Documents unless approved in writing by the Design Professional.

2.2.5.1 Submittal and Shop Drawing Schedule. Concurrent with each Construction Order and Guaranteed Maximum Price Change Order, the CMR shall prepare and submit or amend a Submittal and Shop Drawing Schedule for review and approval of the Design Professional. In establishing the Submittal Schedule the CMR shall take into account large submittal documents that will require longer review times, e.g., submittals with over fifty sheets of drawings. The Design Professional's approval shall be based on conformance of the Submittal and Shop Drawing

Schedule with the Overall Project Schedule, subject to change from time to time in accordance with the progress of the Work.

2.2.5.2 Submission and Approval. The CMR's Submittals must comply with the Contract Documents. The CMR shall review and approve all Submittals prior to submission. The Contract Documents shall specify when shop drawings or submittals require the seal of a specialty consultant. The CMR shall submit copies of Submittals as required by the Contract Documents for the Work of the various trades. The Design Professional shall review, approve, or take other appropriate action with respect to shop drawings, samples, or other submissions of the CMR, including, but not limited to, confirming conformance with the design concept of the Project and with the Contract Documents. The Design Professional shall respond to and return said items to the CMR within fourteen calendar days from receipt provided that the Submittals are submitted by the CMR in accordance with the required Submittal schedule. The Design Professional shall review and give comment or approval to Submittal schedule within fourteen calendar days from receipt. Large submittal documents may require longer review times, e.g., submittals with over fifty sheets of drawings. If, because of events beyond its reasonable control, the Design Professional is not able to meet the specified time period, then it is entitled to ask for additional time from the Board. The CMR shall make all corrections required by the Design Professional and furnish such corrected copies as may be needed. If the CMR believes that any corrections required by the Design Professional constitute a change to the contract, the CMR shall immediately notify the Design Professional and Board and request instructions. By forwarding the approved Submittals to the Design Professional, the CMR represents that the CMR has determined and verified materials, field measurements, and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents. The Design Professional's approval of Submittals shall not relieve the CMR from the responsibility for errors of any sort in Submittals or schedules. The CMR shall perform no portion of the Work for which the Contract Documents require Submittals until the Design Professional has approved the respective Submittal. The CMR shall maintain at the Site one copy of all approved Submittals.

2.2.5.3 Cost of Additional Review. The Design Professional shall be responsible for an initial and one subsequent review of the Submittal. Where the subsequent Submittal is not accepted due to noncompliance with the Contract Documents, the CMR shall be responsible for payment for the additional time required by the Design Professional to complete the Submittal review. The cost of such additional reviews shall be the responsibility of the CMR.

2.2.5.4 Partial Submittals. Partial submittals are not acceptable, will be considered non-compliant, and will be returned without review. The intentional or unintentional waiver by the Design Professional of this requirement against partial submittals, and any review or approval action by the Design Professional on a partial submittal shall not be construed to be a waiver of any submittal requirement, of this provision, or of any other provision or requirement in the Contract Documents. Should the CMR proceed with the Work without the required full review of complete submittals, it does so at its sole risk that the Work performed and the products and materials supplied will meet the requirements of the Contract Documents, and that they will be accepted and authorized for payment. In any event and at any time it is determined that a missing portion of a submittal is needed in order to ensure compliance with the Contract Documents, the Contractor shall immediately submit the missing portion. No increase in the Contract Amount or the Contract Time will be allowed, nor will any variations from the requirements of the Contract Documents be allowed as a result of the failure on the part of the Contractor to provide complete submittals, or as a result of the failure of the Design Professional to garner complete submittals from the Contractor.

2.2.5.5 Compensable Changes by Submittals. In no case shall any submittal review action or comments on the part of the Design Professional or his Consultants be construed to authorize compensable extra Work or an increase in Contract Amount or Contract Time.

2.2.6 Manufacturer's Recommendations. All work or materials shall be installed in accordance with the Contract Documents and the manufacturer's recommendations and requirements. The CMR shall obtain the manufacturer's recommendations, requirements, and referenced standards, for its use at the Site in executing the Work. Manufacturer's recommendations shall include copies of bulletins, circulars, catalogues, or other publications bearing the manufacturer's titles, numbers, editions, dates, etc. Reference standards include standards promulgated by the Board of the standard as referenced in the plans, specifications and applicable building codes. If the manufacturer's recommendations or reference standards are not available, the CMR shall request installation instructions from the Design Professional.

2.2.7 Site Plan.

2.2.7.1 General. The Design Professional is responsible for providing the initial sealed Site Plan. During the Pre-Commencement Phase, the CMR shall review the initial Site Plan and make and submit recommendations for any changes to the initial Site Plan. The CMR is required to obtain the land disturbance permit(s) applicable to the Board that implement the National Pollution Discharge Elimination System (NPDES) requirements for stormwater management for construction activities from the appropriate issuing authority. Compliance requires that there be properly designed Best Management Practices (BMPs), properly installed BMPs, and inspection and maintenance of the installed BMPs.

2.2.7.2 Implementation. The Design Professional will depict upon the Site Plan its initial recommendations as to elements of the erosion, sedimentation, and pollution control plan, specifying his recommended design of BMPs for the Project, including stormwater management facilities, and other like matters. It is the CMR's responsibility to review the design of the BMPs and submit any changes to the plan, including the CMR's desired use of entrances to the Site, CMR's trailer(s) location, laydown areas and other similar matters affecting the design and implementation of the BMPs. The Design Professional and CMR shall arrive at a final sealed Site Plan for submission to the permitting officials that enables the land disturbance permitting of the Project. The Design Professional and CMR shall resolve with the local permitting official any deficiencies by the end of the preconstruction phase so as not to adversely impact the cost and schedule of the Project.

2.2.7.3 Installation, Inspection, and Maintenance. The CMR is responsible for installation and maintenance of the BMPs as a part of the Work. The Design Professional shall obtain the services of a qualified testing laboratory to inspect the BMPs in accordance with the permits, the costs of such inspections to be borne by the Board. In the event of Abnormal Weather Conditions or *force majeure*, the CMR shall be compensated for re-installation of BMPs at established Unit Prices.

2.2.8 Geological and Archeological Specimens. If, during the execution of the Work, the CMR, any Subcontractor, or any servant, employee, or agent of either should uncover any valuable material or materials, such as, but not limited to, treasure trove, geological specimens, archival material, archeological specimens, or ore, the CMR acknowledges that title to the foregoing is vested in the Board. The CMR shall notify the Board upon the discovery of any of the foregoing, shall take reasonable steps to safeguard it, and seek further instruction from the Design Professional. Any additional cost incurred by the CMR shall be addressed under the provision for changed conditions. The CMR agrees that the Geological and Water Resources Division and the Historic Preservation Division of the Georgia Department of Natural Resources may inspect the Work at reasonable times.

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SECTION 3 – CONSTRUCTION PHASE

PART 1 – CONSTRUCTION SERVICES

3.1.1 Basic Construction Services.

3.1.1.1 Requirement to Commence Work. The CMR shall under all circumstances commence Work under this Contract no later than ten (10) days after the Proceed Order Date of a Construction Order or GMP Change Order.

3.1.1.2 Payment for Services and Work. Unless otherwise stipulated, the CMR shall provide and pay for all materials, supplies, labor, services, water, tools, equipment, light, power, transportation, and other utilities and facilities necessary for the proper execution and completion of the Work.

3.1.1.2.1 No Obligation of Board. CMR shall not enter into, execute, or deliver any agreement, document, or undertaking, or incur any obligation with any Trade Contractor, Supplier or Subcontractor in the name of the Board .

3.1.1.2.2 No Conditional Sales Agreements. CMR shall not make, cause to be made, or permit, any contract for materials or equipment of any kind or nature whatsoever to be used in connection with the Work on a conditional sales or any other basis whereby the title to the equipment or materials does not pass to the Board upon delivery to the Site or incorporation in the Project, free and clear of any lien, financing arrangement, or other impediment to title.

3.1.1.2.3 Separate, Distinct, and Independent Covenants. The covenants of this section are separate, distinct, and independent covenants and no default by the Board under the terms of this Contract shall relieve or release CMR of and from the covenants set forth in this section.

3.1.1.3 Quality of Materials and Workmanship. Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of good quality. The CMR shall, if required, furnish satisfactory evidence as to the kind and quality of materials and work. The burden of proof is on the CMR.

3.1.1.4 Quality and Discipline of Employees. The CMR shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him.

3.1.1.5 Failure of the CMR to Supply Workmen. A Notice of Non-Compliant Work may be issued for failure of the CMR to supply enough workers or enough materials or proper materials.

3.1.1.6 Superintendence and Supervision by CMR.

3.1.1.6.1 Supervision by CMR. The CMR shall give efficient supervision to the work, using his best skill and attention. The CMR shall coordinate the prosecution of the Work with the activities and responsibilities of the Board and the Design Professional so as to complete the Project in accordance with the Board's objectives of quality, cost, and time for completion as set forth in the Construction Documents. He shall carefully study and compare all drawings, specifications, and instructions and shall at once report to the Design Professional any error, inconsistency, or omission that he may discover.

3.1.1.6.2 Supervision of CMR. The CMR shall ensure that a competent Project Manager and/or Project Superintendent, and any necessary assistants, remain on the Project, on a full time basis, until Material Completion and correction of all Minor Items (interim Inspection for Punch List Completion – Section 6.4.6), has been satisfactorily achieved under this Contract. The Project Manager and/or Project superintendent shall not be changed except with the consent of the Owner and the Design Professional unless the

Project Manager and/or Project Superintendent proves to be unsatisfactory to the CMR and ceases to be in his employ. The Project Manager and/or Superintendent represents the CMR and all directions given to the manager and/or superintendent shall be as binding as if given to the CMR.

3.1.1.6.3 Replacement Project Manager and/or Project Superintendent. If the CMR terminates the Project Manager and/or Project Superintendent or, if the CMR, for any reason, engages a Project Manager and/or Project Superintendent different from the one originally assigned to the Project, CMR must ensure that the replacement Project Manager and/or Project Superintendent has similar qualifications and experience as the originally identified Project Manager and/or Project Superintendent. Furthermore, the CMR must obtain the Board's prior written approval before engaging a permanent replacement Project Manager and/or Project Superintendent.

3.1.1.6.4 Competent Full-Time Staff. The CMR shall maintain at the Site a competent, full-time staff with appropriate expertise to coordinate and provide general direction of the Work in order to (i) Conduct adequate review and control of the Work as to quality and compliance with the Contract Documents, and (ii) Maintain satisfactory progress by the Trade Contractors involved in the performance of the Work.

3.1.1.6.5 Coordination. Establish with the Design Professional procedures for coordination among the Board, the Program Manager (if engaged), the Design Professional, and the CMR. Establish similar procedures for coordination between CMR and its Trade Contractors and Trade Suppliers with respect to all aspects of the Project, and implement such procedures.

3.1.1.6.6 Qualified Workforce and Sufficient Staff. CMR shall require all Trade Contractors, Subcontractors, and Trade Suppliers to employ, only skilled workmen properly qualified by experience and ability to perform the task assigned to them. In addition, Trade Contractors and Subcontractors shall employ and assign to the Work, at all times, sufficient staff and personnel to perform their subcontracted services in a skilled, professional, and satisfactory manner so as not to delay the progress of the Work. The CMR shall immediately replace or cause to be replaced all workmen whose Work, as determined by the CMR, does not meet such requirements.

3.1.2 Meetings and Schedule Updates.

3.1.2.1 Meetings. CMR may conduct scheduled meetings on a regular basis at which the Board, the Design Professional, the CMR, and Trade Contractors may discuss jointly such matters as procedures, progress, problems, and scheduling. Provide and distribute minutes of such meetings, including therein a list of the action items, responsible parties, and action dates to maintain schedules.

3.1.2.2 Updating Schedules. CMR shall update and revise the Overall Project Schedule, except for modification of Milestones. Milestones shall not be altered without the prior express approval of the Board and Design Professional. CMR shall furnish the Board with updates to the Overall Project Schedule, which shall be revised as required by the conditions of the Work and Project, showing complete preconstruction, procurement, and construction schedules. Such schedules shall set forth the following:

3.1.2.2.1 Major Elements and Components. Listing of all major elements and Components of the Work, as well as major equipment items to be purchased, with adequate information as to those items requiring long lead-time;

3.1.2.2.2 Analysis. An analysis of the types, quantity, and availability of labor required to perform all of the Work;

3.1.2.2.3 Separate Phases. A report of the separate phases of the Work to be performed by the CMR and Trade Contractors, along with a flow chart of the activity sequences, coordination, and duration of each;

3.1.2.2.4 Financial Requirements. A report of monthly and cumulative financial requirements; and

3.1.2.2.5 Status. The status of construction and completion.

3.1.2.3 Joint Development of Procedures. Develop jointly with the Design Professional and Board procedures for the following items:

3.1.2.3.1 Document Transmittal. Preparation, review and execution of forms, transmittals, change orders, applications for payments and other construction administration documents.

3.1.2.3.2 Progress Reports. Monitoring of construction progress and completion of construction documents, interpretation of the Construction Progress Schedule for determination of percentage completion and other progress measurements;

3.1.2.3.3 Cost Control. Monitoring the budget, construction cost control and reporting;

3.1.2.3.4 Lines of Authority. Lines of authority and personnel assignments of CMR's organization;

3.1.2.3.5 Field Construction Procedures. Field construction procedures including, without limitation, safety, construction quality control, logistics, and handling of material and equipment at the Site;

3.1.2.3.6 Storage of Materials. Inventory control and security of stored materials, attic stock and equipment;

3.1.2.3.7 Accounting. Accounting and auditing;

3.1.2.3.8 Other. Such other procedures as may be reasonably required by the Board and Design Professional.

3.1.2.4 Monitoring. CMR shall provide regular monitoring of the Overall Project Schedule as construction progresses; identify potential variances between scheduled and probable completion dates; review the schedule for Work not started or incomplete, and recommend to the Board and Trade Contractors adjustment in the Construction Progress Schedule to meet the Date for Final Completion; provide written summary reports of each monitoring to all appropriate parties and document accordingly.

3.1.2.5 Record Progress. CMR shall record the progress of the Work; submit written progress reports monthly to the Board and the Design Professional, including information on the percentage of completion, in a format as shown in Exhibit D. Maintain a daily log, approved as to form and type of entries by the Design Professional, which log shall be accessible to the Board and the Design Professional at all times during normal business hours.

3.1.2.6 Determine Adequacy. Determine the adequacy of the CMR's, Trade Contractors', and Trade Suppliers' personnel and equipment, as well as the availability of materials and supplies to meet the Construction Progress Schedule; take appropriate action when requirements of the Trade Contracts are not being met.

3.1.2.7 Provide and Pay For. CMR shall provide and pay for all supervision, labor, materials, equipment, utility services (including water, gas, electricity, sewage, or waste water), tools,

supplies, transportation, and other items or facilities necessary for the execution and completion of the Work in accordance with the Contract Documents.

3.1.3 Construction Budget.

3.1.3.1 Provide Budget. Prior to the commencement of the Work under a Construction Order and in the GMP Change Order, the CMR shall document the costs associated with the Construction Order or any GMP Change Order in a document which shall be referred to as the “Construction Budget.” This Construction Budget shall be provided to the Board and Design Professional, including therein as a line item, the estimated cost for each discrete cost of the Work within the Construction Order Sum or the Guaranteed Maximum Price, as the case may be. As the projected cost of the Work becomes more determinable; the CMR shall document approved changes as they occur; shall develop cash flow reports and forecasts; shall identify variances between actual and budgeted costs and shall advise the Board and Design Professional promptly whenever projected costs exceed or may exceed the budgeted cost. The Construction Budget, as revised thereafter, is regularly updated and provided by the CMR to the Board and Design Professional for the purpose of permitting the Board to monitor the progress of the Work and to establish the bases on which claims or requests by the CMR, or other matters, may be evaluated.

The foregoing provision does not authorize the CMR to unilaterally approve Construction Orders, Change Orders, or any changes to GMP. All Construction Orders, Change Orders, and GMP Change Orders must be approved pursuant to Board Policy FGG, which may be periodically revised by the Owner’s governing body, the elected School Board.

Current policy FGG reads as follows:

Construction Manager at Risk (CMR) contracts are Cost Plus Fee Contracts issued with a fixed Guaranteed Maximum Price (GMP). This sets a maximum overall price for the project. A Component Change Order (CCO) is used to authorize the commencement of construction or procurement of any component of the project for which the Board has approved Component Construction Documents. A CCO does not necessarily change the overall amount of a contract, but it may. The GMP shall be established by the GMP Change Order(s), which will include all previously approved CCOs, and is determined at the completion of the final construction documents.

All change orders, including Component Change Orders, must be reviewed by the project Architect/Engineer, appropriate District and Program Management staff as designated by the Superintendent before being recommended for further approval. The Superintendent is delegated authority to approve and sign Change Orders which will change the overall amount of a contract by \$50,000 or less, but cannot approve and sign Change Orders in excess of \$50,000 or Change Orders that would exceed the GMP approved by the School Board. All Change Orders which will change the overall amount of a contract by more than \$50,000 or increase the GMP must be documented as a Board Resolution. Upon approval by the Board, a Change Order may be signed by the Board President, the Superintendent, or the Chief Financial Officer. A summary of all approved Change Orders will be provided to the Board of Education quarterly as an information item.

Any Emergency Change Order in excess of \$50,000 may be approved by the Superintendent or his/her designated alternate, the Chief Financial Officer or his/her designated alternate, and the Board President or Vice President, signed by all three approvers, and presented to the Board for ratification at the next available Board meeting.

3.1.3.2 Cost Control System.

3.1.3.2.1 Develop System. The CMR shall develop a system of cost control for the Work, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes.

3.1.3.2.2 Implement System. The CMR shall monitor costs and implement the system of cost control for the Work, revise from time to time the Construction Budget with approved changes, and develop cash flow reports and forecasts as requested by the Board. The CMR shall identify variances between actual and estimated costs and report the variances to the Board and Design Professional at regular intervals.

3.1.3.3 Cost Accounting Records. The CMR shall maintain cost accounting records on items of Actual Cost and Contingency Costs, including authorized Work performed under unit costs, Actual Costs and Contingency Costs for labor and materials, and other bases requiring accounting records. The CMR shall maintain at the Project Site accounting records for Trade Contracts, this Contract, and other Contracts related to the Project.

3.1.3.4 Payment Procedures. The CMR shall develop jointly with the Design Professional and Board procedures for reviewing, processing, recording, and paying Trade Contractors and Trade Suppliers upon their application for payment, and implement same consistent with the Contract Documents. Develop and implement a procedure for the review, processing, and payment of applications by Trade Contractors and Trade Suppliers for progress and final payments, including a retainer release method. Such procedure shall be submitted to the Board for approval.

3.1.4 Coordination of the Work.

3.1.4.1 Coordination. The CMR shall establish with Trade Contractors, Suppliers and Subcontractors the on-Site organization and lines of authority in order to carry out the overall progress of the Work. The CMR shall coordinate the Work of the CMR and other contractors directly contracted by the Owner, under the Contract Documents with professional consultants retained by the Board or the Design Professional.

3.1.4.2 Construction Means and Methods. The CMR shall be responsible for coordinating all portions of the Work under this Contract. He shall be responsible for construction means, methods, techniques, sequences, and procedures, as well as for safety precautions and programs in connection with the Work. He shall ensure that the foregoing activities are performed in compliance with the Contract Documents. Notwithstanding the foregoing, no Trade Contractor is relieved of its responsibility for taking all reasonable and necessary steps to perform all Work consistent with the Contract Documents.

3.1.4.3 Quality Control. CMR shall review the Work of Trade Contractors and Trade Suppliers for defects and deficiencies. CMR shall develop and implement a system, including appropriate quality control documentation, for ensuring that all such defects and deficiencies are corrected.

3.1.4.4 Procedures for Change Orders. CMR shall coordinate and develop for Trade Contractors and Subcontractors procedures for (i) preparation, review, and processing of Change Orders; (ii) recommending necessary or desirable changes to the Board and the Design Professional; (iii) reviewing requests for changes by the Board, Trade Contractors, or Suppliers; (iv) reviewing requests for changes by the Board, Trade Contractors, or Suppliers; (iv) submitting recommendations to the Board and the Design Professional with respect to proposed Change Orders; and (v) implementing Change Orders as approved by the Board .

3.1.4.5 Procedures for Approval of Materials. CMR shall develop procedures to ensure that no materials shall be purchased unless and until Component Construction Documents, defining or affecting such materials have been approved by the Board and then only in conformance with the Construction Order or Construction Documents Change Order.

3.1.5 Mobilization. CMR shall mobilize, transport and assemble its equipment, materials, and supplies, as well as construct such temporary systems as are necessary and required at the Site, all in adequate time for satisfactory performance of the Work.

3.1.6 Duty to Commence.

3.1.6.1 Time for Commencement. Within ten (10) days after the Proceed Order Date, the CMR shall commence to procure such services, labor, and materials necessary to perform the Work described in any approved Construction Order or the GMC Change Order, but only to the extent Construction Documents for said Work or affecting said Work have been approved by the Board.

3.1.6.2 No Direct Performance. The CMR shall not directly perform any Work or provide any materials, equipment, or supplies but shall contract for performance of Work or procurement of materials, equipment, or supplies through Trade Contracts and Subcontracts, except as otherwise permitted by the Contract Documents. No fee shall be payable by the Board to the CMR for self-provided Work or materials except by lump sum as provided in Section 3.2.3.2.

3.1.6.3 Responsibility for Proper Performance. Notwithstanding CMR's execution of contracts with Trade Contractors, Subcontractors or Suppliers incident to the performance of the whole or any part of the Work, the CMR shall be responsible to the Board for the proper performance of the Work in compliance with the Contract Documents unless the Contract Documents expressly provide to the contrary. Unless caused by the Board or Design Professional, inefficiency, non-performance, improper performance, or other default by any Trade Contractor or Trade Supplier under contract with CMR or employee thereof shall not excuse the CMR from its obligation to assure timely performance in compliance with the Contract Documents.

3.1.6.4 Acts and Omissions. The CMR shall be fully responsible for the acts and omissions of its officers, employees, agents, licensees, Trade Contractors, Subcontractors, Suppliers, invitees and guests, as well as their respective officers, employees, agents, licensees, suppliers, guests, materialmen, and all other persons performing any of the Work or supplying labor, services, materials, or equipment for or under the Trade Contracts entered into by the CMR. The failure of a Trade Contractor, Subcontractor or Supplier under contract with CMR or employees thereof to properly perform shall not excuse the CMR for any omission from or non compliance with the requirements of the Contract Documents, nor shall the CMR be entitled to an extension of time because of the failure of a Trade Contractor, Subcontractor or unless such failure was a direct result of some delay to the Trade Contractor or Trade Supplier of the kind and character for which the CMR is entitled to receive an extension of time.

3.1.6.5 Responsibility for Completion. CMR shall complete the Work under Construction Orders and the GMP Change Order and shall achieve Material Completion of the Project not later than the Material Completion and Occupancy Date.

3.1.7 Notice of Commencement. The CMR shall, in accordance with Georgia law, record and post a Notice of Commencement for the construction portion of the Work, and shall promptly deliver a stamped-recorded copy of such Notice of Commencement to the Board and Design Professional.

3.1.8 Measurements and Dimensions. Before ordering material or doing work that is dependent upon coordination with building conditions, the CMR shall verify all dimensions, elevations, grades, and pitch by taking measurements at the building and shall be responsible for the correctness of same. Any discrepancies between the drawings and/or specifications and the existing conditions shall be referred to the Design Professional for additional instructions before any work affected thereby is begun.

3.1.9 Rain Water, Surface Water, and Back-up. The CMR shall protect all Work as a part of the CMR General Conditions, including but not limited to, excavations and trenches, from rainwater, surface water, and back up of drains and sewers. The CMR shall furnish all labor, pumps, shoring, enclosures, and equipment necessary to protect and to keep the Work free of water.

- 3.1.10 Dust Control.** The CMR shall include and provide as a cost of the Work dust-proof enclosures or partitions for protection wherever dusty or dirty work is performed and dampening of debris to avoid dusting when removed.
- 3.1.11 Cutting, Patching, and Fitting.** The CMR shall do all cutting, patching, and fitting of the Work that may be required to make it's several parts come together properly and fit.
- 3.1.12 Space Conditions.** All pipes passing through floors, walls, and ceilings shall be installed with sufficient space between them to permit installation of pipe insulation and floor, wall, and ceiling plates without cutting of insulation or plates. Roughed-in dimensions shall be prepared by the CMR to accomplish this requirement. The CMR shall locate all equipment that must be serviced, operated, or maintained in fully accessible positions. This provision includes but is not limited to valves, traps, cleanouts, motors, controllers, switchgear, drain points, filter, access doors, and fire dampers. If spaces, dimensions, or other design conditions do not permit compliance with the present article, the CMR shall file a request in writing with the Design Professional for additional instructions, furnishing a copy to the Board.
- 3.1.13 Cleaning.**
- 3.1.13.1 During Construction. At all times, the CMR shall keep the premises free from accumulations of waste material or rubbish caused by his employees, Trade Contractors, or work. Periodically during the course of the Work he shall remove all his rubbish from and about the building and all his tools, scaffolding, and surplus materials and shall leave his work "broom-clean" or its equivalent, unless more exactly specified. Prior to Final Completion by a Trade Contractor of any Trade Contract, CMR shall require the Trade Contractor to remove from the Work and Site all temporary systems, tools, equipment, machinery, and surplus materials not required for the continued performance of any Work under the Trade Contract or this Contract.
- 3.1.13.2 Prior to Material Completion. Prior to the inspection for Material Completion of the Project CMR shall remove from the Site all wastes and rubbish, clean all tile and glass surfaces, replace broken glass, remove stains, paint spots, and clean and polish all plumbing fixtures and equipment, leave the Work "*vacuum clean*" or its substantial equivalent, all hard surface floors swept and mopped, all carpeted floors vacuumed, all surfaces other than floors dusted, blower dusted, or wiped (depending on type of surface) and mars cleaned, all glazing washed [both sides], and all electrical and mechanical equipment and fixtures cleaned, with all ductwork cleaned before other cleaning is started, and re-cleaned if any dust or dirt has gotten into the ductwork during the cleaning process. The CMR shall restore existing facilities such as roads, other paved surfaces, fencing, curbing and the like at the Site to at least their preconstruction conditions; provided, however, the CMR may, in an orderly fashion, leave such equipment and supplies at the Site as necessary to achieve Final Completion of the Project. This cleaning must be completed before the CMR can expect the Design Professional to commence the inspection for Material Completion. To achieve Material Completion, the CMR shall have fully cleaned the Site – all debris must have been removed from the site and all paved surfaces must have been broom swept and thoroughly hosed down.
- 3.1.14 Duty of CMR to Report Defects.** If any part of the CMR's work depends for proper execution or results upon the work of any Separate CMR to the Board, the CMR shall inspect and promptly report to the Design Professional any apparent defects in such work that render it unsuitable for such proper execution and results.
- 3.1.15 Duty of CMR to Report Conflicts.** To ensure the proper execution of any subsequent work, the CMR shall measure work already in place and shall at once report to the Design Professional any discrepancy between the executed Work and the drawings or specifications.

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PART 2 – CONSTRUCTION ORDERS

3.2.1 Scope of Part. This Part shall govern the performance of all construction Work under a Construction Order unless the provisions of this Contract are modified by Change Order. This Contract shall not apply, and none of the responsibilities of the CMR stated herein shall apply, to Work performed by a separate Contractor for which CMR is not responsible under this Contract.

3.2.2 Construction Order Proposal.

3.2.1.1 Prerequisites to Board Approval and Proceed Order. Prior to acceptance of a Construction Order by the Board the requirements set forth in Section 2.1.2 must be met.

3.2.1.2 Proposal. If prior to the execution of the GMP Change Order, the CMR proposes and the Board authorizes the commencement of construction or procurement of any Component of the Project for which the Board has approved Component Construction Documents, the Board shall request the CMR to procure proposals in accordance with Section 3, Part 7 below, and to submit a proposed Construction Order to this Contract under which the CMR shall offer to contract with a Trade Contractor(s) for the construction of the Component or with a Trade Supplier(s) for procurement of the Component in accordance with the Component Construction Documents. The Board's request shall identify the specific Component of the Project for which a proposed Change Order is requested.

3.2.1.3 Component Construction Documents. The Design Professional shall issue Component Construction Documents meeting the following minimum criteria:

- a. The Component Construction Documents shall reasonably show the intent of the Work to be accomplished;
- b. The Component Construction Documents shall be sufficient for the CMR to price the Work;
- c. The Component Construction Documents shall meet all regulatory and Fire Marshal requirements; and
- d. The Component Construction Documents shall be sufficiently detailed to preclude the necessity for rework as the Construction Documents proceed to 100% completion.

3.2.3 Construction Order Sum.

3.2.3.1 Change Order Sum. The Change Order Sum for Work or materials contracted for by the CMR under a Construction Order shall consist of the following:

3.2.3.1.1 Trade Contractors and Trade Suppliers. The Subcontract Sums due the Trade Contractors or Trade Suppliers retained by CMR for the performance of the Work;

3.2.3.1.2 CMR's Overhead, Costs, and Expenses. The CMR's Estimated Cost (based on anticipated Actual Costs (as defined in Section 4, Part 4) for the performance of the Work that are not represented by services and that are not included in the services or materials provided by the Trade Contractor or Trade Supplier in Section 3.2.3.1.1 above;

3.2.3.1.3 Construction Contingency. Construction Contingency (as defined in Section 4, Part 4) for the Component's anticipated contingency costs incident to the performance of the Work and procurement of the materials for the Component; and

3.2.3.1.4 CMR's Construction Fee. The CMR's Fee for the performance of the Work, which shall be stated as a lump sum amount commensurate with the scope of the Construction Order and paragraph 5 of the Contract.

3.2.3.2 CMR Self-Performance. In the event the CMR self performs the Work contained in any Construction Order, the Change Order Sum shall be established in accordance with the provisions of Section 3.7.8.

3.2.3.3 Mobilization Costs.

3.2.3.3.1 Staff. To the extent the CMR's Estimated Cost Component of the Change Order Sum includes estimated Actual Costs for CMR's staff reimbursable under Section 4, Part 4, incident to mobilization of its own forces for Work under the proposed Construction Order, CMR shall submit as part of its proposed Construction Order estimated actual costs of staff based upon the Staffing Plan, Wage and Salary Schedule (See Exhibit K).

3.2.3.3.2 Temporary Structures. To the extent the CMR's Estimated Cost Component of the Change Order Sum includes estimated Actual Costs for CMR's on-site offices or for other temporary structures and equipment incident to mobilization of its own forces for Work under the proposed Construction Order, CMR shall submit as part of its proposed Construction Order a proposed budget for such costs and a proposed plan for acquisition of such items. If the Board approves the provision by CMR of on-site office facilities and other temporary structures and equipment from CMR's own inventory, See Section 3.7.11.

3.2.4 Unacceptable Proposals. If prior to its acceptance of a proposed Construction Order the CMR shall give notice to the Board that the lowest responsible proposal received by the CMR from a Trade Contractor to perform the Work described in the proposed Change Order exceeds the CMR's Construction Cost Estimate for that Work, or that no responsible proposal for that Work has been received, then the CMR may propose to either (1) request a redesign of Construction Document governing the Component (so long as the redesign is a functional and quality equivalent); or (2) request that the CMR perform the Work with its own forces for the lump sum amount stated in the CMR's Construction Cost Estimate, which shall be the lump sum Change Order Sum. Any architectural fees and costs for a requested redesign approved by Board shall be paid by CMR to the Design Professional through the Board. The Board, in its sole and absolute discretion, may reject either or both proposals made by CMR.

3.2.5 Time for Review. The Board shall have thirty (30) days following its receipt of the CMR's proposed Construction Order under this Article to accept or reject same.

3.2.6 Approval of the Component Change Order by the Board. Pursuant to Board Policy FGG, all Change Orders, including Construction Orders, must be reviewed by the project Architect/Engineer, appropriate District and Program Management staff as designated by the Superintendent before being recommended for further approval. The Superintendent is delegated authority to approve and sign Change Orders which will change the overall amount of a contract by \$50,000 or less, but cannot approve and sign Change Orders in excess of \$50,000 or Change Orders that would exceed the GMP approved by the School Board. All Change Orders which will change the overall amount of a contract by more than \$50,000 or increase the GMP must be documented as a Board Resolution. Upon approval by the Board, a Change Order may be signed by the Board President, the Superintendent, or the Chief Financial Officer. A summary of all approved Change Orders will be provided to the Board of Education quarterly as an information item.

3.2.7 Emergency Change Order Approval. Pursuant to Board Policy FGG, Any Emergency Change Order in excess of \$50,000 may be approved by the Superintendent or his/her designated alternate, the Chief Financial Officer or his/her designated alternate, and the Board President or Vice President, signed by all three approvers, and presented to the Board for ratification at the next available Board meeting.

3.2.8 Rejection. If the Board rejects the CMR's proposed Construction Order, CMR may revise and resubmit same but shall not be obligated to do so. In the event that no such Construction Order can be agreed upon, CMR shall continue its performance under any Construction Orders then

outstanding and with the performance of any other services required under this Contract until such time as a Component or GMP Change Order is approved or either party elects to terminate this Contract. If the Board rejects the CMR's proposed Construction Order, Board may remove by Change Order from the Contract Documents the Work contemplated by the rejected Construction Order and may use alternative methods for the construction or procurement of the Work involved and CMR shall not be entitled to any Fee or other compensation with respect to such Work. In the event that the Board uses alternative methods for the construction or procurement of the Work, the CMR must cooperate with the Board in order to get the Work completed.

3.2.9 Notice of Acceptance and Proceed Order for a Component. If the Board accepts the CMR's proposed Construction Order, the Board shall give written notice of same by returning the proposed Construction Order with its acceptance endorsed thereon and shall issue to CMR the Proceed Order to construct the Component. At that time, the Construction Order shall become a part of the Contract Documents. Thereafter, the Work performed thereunder shall be performed and administered in accordance with the Contract Documents.

3.2.10 Duty to Proceed. Upon receipt of the Board's Notice of Acceptance and Proceed Order of the proposed Construction Order, the CMR shall, no later than ten days after the Proceed Order Date, commence performance of the Work covered by the Construction Order. The Proceed Order Date shall be the starting date for the Work covered by the Construction Order.

3.2.11 Board's Liability.

3.2.9.1 Maximum Liability. The Change Order Sum as stated in a Construction Order shall be the maximum amount that the Board is required to pay to CMR for the performance of the Work under a Construction Order. The Change Order Sum, however, may be increased or decreased under those circumstances where other Sections of this Contract authorize an increase or decrease in the Contract Price or the payment of additional compensation. This increase or decrease shall be added to or subtracted from the original Change Order Sum to determine the revised Change Order Sum.

3.2.9.2 Maximum Sum Calculated. Where the Change Order Sum is so calculated, the sum of (i) the Contract Sum payable to the Trade Contractor or Trade Supplier plus (ii) the CMR's Estimated Costs plus (iii) Construction Contingency plus (iv) CMR's Fee shall be the maximum sum that Board shall be obligated to pay CMR for the performance of the Work encompassed by the Construction Order.

3.2.12 Completion Date. The completion date for the Work as stated in a Construction Order shall be subject to extension or acceleration under those circumstances where other provisions of this Contract authorize an extension or acceleration in the time.

3.2.13 Effect of GMP Change Order. At the time CMR submits its GMP Change Order proposal under Section 3.3.1, the cost components in all Construction Orders accepted by the Board as of that date shall be incorporated into the corresponding GMP cost components (See Section 3.3.1.3). The Board shall receive a credit for payments it has made under all Construction Orders after approval of the GMP Change Order.

3.2.14 Cumulative Effect of Construction Orders. Estimated Costs and Contingency Costs components of the Change Order sums of Component Changes Orders shall be cumulative so that the aggregate of the Estimated Costs and Contingency Costs components of all Construction Orders that are outstanding at any time shall be available for payment to CMR for Actual Costs and Contingency Costs incurred by CMR in the performance of any Work governed by the aggregate of such Construction Orders outstanding.

PART 3 – GMP CHANGE ORDER

3.3.1 Guaranteed Maximum Price Change Order.

3.3.1.1 Guaranteed Maximum Price Proposal. The CMR shall propose a Guaranteed Maximum Price (GMP) and shall include in his proposal all services, equipment, labor, and materials required by the Contract Documents. Upon approval, the GMP Change Order, including the CMR's proposal, will become a part of the Contract Documents.

3.3.1.2 Submission of Guaranteed Maximum Price Proposal. The GMP Change Order shall be proposed at the time as stipulated on the Overall Project Schedule as approved by the Board as follows:

3.3.1.2.1 If Prior to Completion of Construction Documents. During the preparation of Design Development Documents and when the Project drawings and specifications are sufficiently complete and preliminarily approved by the Board and applicable regulatory agencies, CMR shall submit to the Board a proposed GMP Change Order to establish the Guaranteed Maximum Price. Under the GMP Change Order the CMR shall proposed to perform the construction of the entire Project in accordance with the assumptions stated in the GMP Change Order, for a Guaranteed Maximum Price.

3.3.1.2.2 If Concurrent or after Completion of Construction Documents. If the Construction Documents are completed, the GMP Change Order and the Construction Documents Change Order may be proposed concurrently; or, the GMP Change Order may be proposed no later than thirty (30) days following the Construction Documents Change Order.

3.3.1.3 GMP Defined. The Guaranteed Maximum Price shall be inclusive of (i) the CMR's Estimated Cost of the Work, (ii) the Construction Contingency, (iii) the CMR's Fee for Construction and Preconstruction services and, (iv) the CMR's Estimated Overhead costs for Construction and Preconstruction services, to be set forth in the proposed GMP Change Order, (v) the sum of all approved Change Orders, and to achieve Material Completion of the Project by the Material Completion Date specified in the proposal GMP Change Order as follows:

(a) CMR's Preconstruction Overhead Costs and Expenses. The proposed GMP Change Order shall include as a separately identified item, a maximum amount for CMR's Preconstruction Overhead Costs and Expenses for performance of the Work.

(b) CMR's Preconstruction Fee. The proposed GMP Change Order shall include, as a separately identified dollar amount, stated as a maximum (not to exceed) sum, the Preconstruction Fee for the CMR's performance of Preconstruction Phase Services.

(c) Estimated Cost of the Work. The proposed GMP Change Order shall include separately identified dollar amounts, stated as a maximum (not to exceed) sum, for Actual Costs as estimated by the CMR for the complete construction of the Project, which amount shall include all Trade Contract and Subcontract Sums, costs of materials. The estimated costs shall include the Actual Cost components of approved Construction Orders (exclusive of CMR Construction Fee, Overhead Costs and Contingency) but not the lump sum amounts of any other approved Change Orders (See Item (g) below).

(d) CMR's Construction Contingency. The proposed GMP Change Order shall include, as a separately identified item, a Construction Contingency sum in an initial amount (subject to increase or decrease) against which CMR can draw at its election for the purposes set forth in Section 4 Part 4. The Construction Contingency sum established with the GMP Change Order shall include the

contingency amounts previously stated as part of the Construction Order Sums in this Section.

(e) CMR's Overhead Costs and Expenses. The proposed GMP Change Order shall include, as a separately identified item, a maximum amount for CMR's Construction phase Overhead Costs and Expenses for performance of the Work. The maximum amount shall include the amounts previously stated as part of approved Construction Orders.

(f) CMR's Construction Fee. The proposed GMP Change Order shall include, as a separately identified dollar amount, stated as maximum (not to exceed) sum, the Construction Fee for CMR's performance of the Work as calculated using the percentages stated in Paragraph 5 of the Contract, and will fluctuate with the actual cost of the work. The Construction Fee shall include the fee amounts previously stated as part of approved Construction Orders. The CMR's Fee shall not be increased because the Actual Cost of the Work, Overhead and Expenses exceeds the allowable limits.

(g) Change Order Sums. The proposed GMP Change Order shall include, as a separately identified amount the total sum of Change Orders (Not Construction Orders, See Section 3.4.8.3) approved as of the Date of the GMP Change Order submittal.

(h) Credit for Payments. The Board shall receive a credit for all payments made under the Contract Documents, as against the CMR Fee and the cost of Basic Services and the Work.

3.3.1.4 CMR's Statements and Submittal of GMP Change Order.

3.3.1.4.1 Format for Submittal. The CMR's proposed GMP Change Order shall be submitted to the Owner as an offer in the form set forth in Section 7 forms.

3.3.1.4.2 The CMR shall include within the proposed GMP Change Order statements identifying the Construction Documents, estimate of costs, guaranteed Material Completion Date (incorporating all prior approved time extensions), the Construction Budget used in the preparation of the GMP Change Order proposal and the items listed below. The CMR shall also provide the documents (Subparagraphs (d) through (o) below) as described in Paragraph 2.1.2. as (i) Original submission, (ii) Update of previously submitted and approved documents amended to incorporate the proposed GMP Change Order, (iii) If not change to previously submitted and approved document, provide name and date of document.

(a) Construction Documents. list of the drawings and specifications, including all addenda and Bulletins thereto without limitation the Conditions of the Contract, which were used in preparation of the [Component or Guaranteed Maximum] Price proposal.

(b) List of Clarification, Assumptions and Exclusions. List Clarifications and Assumptions and a listing of any trade, Work categories, or other items that are not included in the [Component or Guaranteed Maximum] Price.

(c) Cost Summary of CCO/GMP Sum and Construction Budget. The proposed [Component or Guaranteed Maximum] Price, including a summary of the estimated cost organized by trade categories, allowances, contingency and other items, along with the fee, that compose the Price, and a Construction Budget prepared in accordance with this Contract.

- (d) Bid Backup and All Estimates. A hard copy of all bid backup and all estimates.
- (e) Payment and Performance Bonds. An original Payment Bond and Performance Bond (or endorsements) for 100% of the [CCO or GMP] amount.
- (f) Construction Management Plan. Construction Management Plan including a staffing plan correlated with a Staffing Plan, Wage and Salary Schedule (Subparagraph (i) below) for CMR's staffing of the project during the course of the Work, for which CMR proposes that the Owner reimburse CMR Actual Costs under this Contract.
- (g) Land Disturbance Permit Documentation. Land Disturbance Permit Documentation.
- (h) Quality Control Program. A copy of the CMR's quality control program.
- (i) Construction Progress Schedule. Construction Progress Schedule prepared in accordance with this Contract including the dates assumed by CMR for the Design Professional's completion of Construction Documents necessary to effect the Program.
- (j) Staffing Plan, Wage and Salary Schedule. CMR's updated Staffing Plan, Wage and Salary Schedule.
- (k) List of Trade Contractors, Subcontractors and Suppliers. List of intended, prequalified or contracted Trade Contractors, Subcontractors and Suppliers.
- (l) Submittal and Shop Drawing Schedule. Submittal and Shop Drawing Schedule indicating both proposed submission and approval dates to which schedule the Design Professional shall have agreed.
- (m) Proof of Subcontractor insurance. Certification by the Construction Professional that all Subcontractors performing work on this Project are covered by their own workers' compensation insurance. Certificates as such are included as an Exhibit to each Subcontract Agreement between the CMR and Subcontractor and will be supplied by each Subcontractor prior to commencement of physical work onsite. Copies of approved certificates will be forwarded to Owner upon receipt.
- (n) Subcontractors' Affidavits of Ga. Security and Immigration Compliance. Certification by the CMR that all Subcontractors performing work on this Project will be required to submit a fully executed Georgia Security and Immigration Compliance Act Affidavit as part of award of a Subcontract Agreement. Certificates as such are included as an Exhibit in each Subcontract Agreement between the CMR and each Subcontractor and will be supplied by each Subcontractor prior to commencement of physical work onsite. Copies of approved certificates will be forwarded to the District upon receipt.
- (o) Design Professional's Schedule Concurrence. The Design Professional's concurrence with the Construction Progress, including the Construction Documents completion, and the Submittal and Shop Drawing Schedule.

3.3.1.5 No Allowances Permitted in GMP. While allowances may be utilized in the cost calculations for portions of the Project not yet fully designed during the Preconstruction Phase of this Agreement, the CMR shall not include any cash allowances in the GMP Change Order proposal. The CMR may include within the GMP Change Order proposal such assumptions deemed appropriate concerning costing issues used in developing the proposed GMP. The CMR acknowledges and agrees that the

GMP includes sums for overhead and CMR's Fee on account of all assumptions. No demand for overhead and profit other than those included in the GMP shall be allowed.

3.3.2 GMP Proposal Review Meeting

Following CMR's submission of the proposed GMP Change Order and prior to its acceptance, the Board and Design Professional shall meet with the CMR to review the proposed GMP Change Order and the statement of its basis. The Board and the Design Professional shall promptly notify the CMR of any errors or omissions they discover in the presented information during their review of same. CMR shall be entitled to make any necessary adjustments to the proposed GMP Change Order as a result of any errors discovered by the CMR, the Design Professional, or the Board prior to its acceptance by the Board. Neither the Design Professional nor the Board has any duty to CMR to examine the proposed GMP Change Order to discover such errors and no error discovered after acceptance by the Board of the GMP Change Order shall constitute a basis for a change therein or a modification to this Contract.

3.3.3 Acceptance or Rejection of GMP Change Order.

3.3.3.1 Time for Acceptance or Rejection. The Board shall have fifteen (15) business days from the receipt of CMR's proposed GMP Change Order to accept or reject same.

3.3.3.2. Approval of GMP Change Order by the Board. Pursuant to Board Policy FGG, all Change Orders, including Construction Orders, must be reviewed by the project Architect/Engineer, appropriate District and Program Management staff as designated by the Superintendent before being recommended for further approval. The Superintendent is delegated authority to approve and sign Change Orders which will change the overall amount of a contract by \$50,000 or less, but cannot approve and sign Change Orders in excess of \$50,000 or Change Orders that would exceed the GMP approved by the School Board. All Change Orders which will change the overall amount of a contract by more than \$50,000 or increase the GMP must be documented as a Board Resolution. Upon approval by the Board, a Change Order may be signed by the Board President, the Superintendent, or the Chief Financial Officer. A summary of all approved Change Orders will be provided to the Board of Education quarterly as an information item.

3.3.3.3 Emergency Change Order Approval. Pursuant to Board Policy FGG, Any Emergency Change Order in excess of \$50,000 may be approved by the Superintendent or his/her designated alternate, the Chief Financial Officer or his/her designated alternate, and the Board President or Vice President, signed by all three approvers, and presented to the Board for ratification at the next available Board meeting.

3.3.3.4 Written Notice of Acceptance. If the Board accepts the CMR's proposed GMP Change Order, the Board shall give written notice of same by returning the GMP Change Order with its acceptance endorsed thereon and shall issue to CMR a Proceed Order. At that time, the GMP Change Order shall become a part of the Contract Documents. Thereafter, the Work performed thereunder shall be performed and administered in accordance with the Contract Documents. The date of the Proceed Order shall be the starting date for the Work covered by the GMP Change Order.

3.3.3.5 Rejection of GMP Proposal. If the Board rejects the CMR's proposed GMP Change Order, CMR may, but shall not be obligated to, revise and resubmit same. In the event no GMP Change Order can be agreed upon, CMR shall continue its performance under any Construction Orders then outstanding and with the performance of any other services required under this Contract until such time that a GMP Change Order is approved or either party elects to terminate this Contract.

3.3.4 Duty to Proceed. Upon receipt of the Board's Notice of Acceptance of the GMP Change Order and Proceed Order, the CMR shall promptly begin or continue the prosecution of the Work in accordance with the Contract Documents, but in any event, performance of the Work covered by the GMP Change Order shall commence no later than ten (10) days after the Proceed Order Date. The Proceed Order Date shall be the starting Date for the Work covered by the GMP change Order.

3.3.5 Modification of GMP. The Guaranteed Maximum Price shall be subject to additions and deductions by Change Order.

3.3.6 Replacement of GMP with Lump Sum Price.

3.3.6.1 Board's Option. At Board's sole option at or after completion of ninety-five percent (95%) of Construction Documents, Board may request CMR to propose a Lump Sum Price to replace the GMP for full and final completion of the Project. Board may, in its sole discretion, accept such Lump Sum Price, reject such Lump Sum Price, or enter into negotiations with CMR to reach a mutually agreeable Lump Sum Price. The cost of preparation of the Lump Sum Price Proposal may be paid from the Construction Contingency. Upon agreement as to the Lump Sum Price, the change shall be effected by a Lump Sum Price Change Order.

3.3.6.2 Effect of Lump Sum Price Change Order. The Lump Sum Price shall become the Contract Price for full and final completion of the Project in accordance with the Contract Documents. The CMR's Fee and the Construction Contingency shall be eliminated from the Construction Budget and, to the extent they have been paid, shall be included in the Lump Sum Fee. Unpaid amounts from these GMP budget categories shall be returned to the Board, provided however, that CMR may retain within the Lump Sum Price the reasonable amounts required for completion of the Design Professional services and for the reasonable CMR's Fee to be earned through completion of the Project. Within ten (10) days of the execution of the Lump Sum Price Change Order, CMR shall present for the approval of the Design Professional and Program Manager and Board a schedule of values for the periodic payment of the remaining contract balance, which approval shall not be unreasonably withheld.

3.3.6.3 Periodic Payments of the Lump Sum Price. The cost accounting and payment provisions contained in this agreement are superseded and modified to the extent of the following:

(a) Periodical Estimates and Receipts.—The CMR shall submit to the Design Professional and Board in accordance with a form to be supplied by the Board (specimen of which will be supplied upon request) an application (sometimes herein designated "periodical estimate") for each payment, and, if requested by the Board, Program Manager or Design Professional, receipts or other vouchers showing his payments for materials and labor, including payments to Trade Contractors, Trade Suppliers, and subcontractors.

(b) Initial Breakdown and Periodic Payments.—If payments are made on valuation of work done, such application shall be submitted at least ten days before each payment falls due. Before the first application, the CMR shall submit to the Design Professional and Program Manager a schedule of values of the various parts of the work, including quantities, aggregating the total sum of the contract, divided in such manner as to facilitate payments to Trade Contractors, Suppliers, and subcontractors, on a form to be furnished by the Board with a complete breakdown of the Lump Sum Price so arranged and so itemized as to meet the approval of the Design Professional and Board and, if requested, supported by such evidence as to its correctness as the Design Professional and Board may direct. The schedule, designated herein the "initial breakdown" (specimen of which will be supplied on request), when approved by the Design Professional and Board, shall be used as a basis for certificates of payment unless it be found to be in error. In applying for payments, the CMR shall submit a statement based upon this schedule on the periodical estimate form and, if requested by the Design Professional and Board, said statement shall be itemized in such form and supported by such evidence as the Design Professional and or Board may direct, showing the CMR's right to the payment claimed on the periodical estimate.

(c) Materials stored.— If periodic payments are made on account of materials delivered and suitably stored at the site but not incorporated in the work, they shall, if required by the Board, or the Design Professional, be conditional upon submission by the CMR of bills of

sale or such other procedure as will establish the Board's title to such material or otherwise adequately protect the Board's interest. The CMR is responsible for the existence, protection, and, if necessary, replacement of materials until issuance of the Final Certificate by the Design Professional and Board . The Board shall not pay for any materials stored off site without consent of the Owner.

(d) Processing of Periodic Estimates.—The Design Professional and Program Manager will review the Periodic Estimate prepared by the CMR and, if they concur, execute a certificate on the face of the Periodic Estimate as to its accuracy. The Design Professional and Board or Program Manager shall visit the project site after the CMR and Design Professional have agreed on the Periodic Estimate and conduct such inspections and reviews as are necessary to make a decision as to the accuracy of the Periodic Estimate. If the Design Professional and the CMR cannot agree on the appropriateness of the Periodic Estimate in question, the Design Professional and Board shall make a decision. Upon determining the appropriateness of the estimate, the Design Professional and Program Manager shall execute the certificate of Periodic Estimate and forward it to the Board for payment.

3.3.6.4 Changes to the Lump Sum Price. As otherwise permitted by this Contract, the Lump Sum Price shall be subject to additions and deductions by Change Order.

PART 4 – CHANGES TO THE WORK

- 3.4.1 Acknowledgement of Existing Physical Conditions.** In undertaking the work under this Contract, the CMR acknowledges that it has visited the premises and has taken into consideration all open and apparent conditions that might affect its work. No claim based on lack of knowledge of existing conditions shall be allowed unless the existing physical conditions cannot be discovered by a reasonably observant person. Any claims relating to conditions that are materially different from the Contract Documents that were not open and apparent may be adjusted as provided in this Part.
- 3.4.2 Board's Right to Make Changes.** Without invalidating the Contract, the Board, by Change Order and without notice to the sureties, may authorize or order extra work or changes by altering, adding to, or deducting from the Work or the Contract Time, the Contract Sum being adjusted accordingly. All Change Orders shall be performed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of signing of the Change Order. (See Change Order formats in Section 7.) Prior to the issuance of the Proceed Order, the CMR and the Board shall advise each other in writing of their designees authorized to accept and approve changes to the Contract Sum and the limits to each designee's authority. Should any designee or limits of authority change during the time this Contract is in effect, the CMR or Board shall give written notice to the other as provided in Section 1.1.5. There is no legal limitation on the Board's right to make changes such as may be, in the Board's sole discretion, useful or desirable to the Project.
- 3.4.3 Changes Forbidden without Consent of Board.** Neither the Design Professional nor the CMR shall make any change whatsoever in the work without an approved Change Order. Except for emergency situations described in Section 1.4.4, CMR hereby agrees that it will not make or seek to make any claim for additional compensation or change to the contract time against the Board for any work performed by the CMR or its subcontractors which was not directed and authorized in advance of commencement of performance of such work by a change order executed by the Board. Any additional work performed by the CMR without a change order will not entitle the CMR to an increase in the contract sum or extension of the contract time.
- 3.4.4 Form and Execution of Change Orders.**
- 3.4.4.1 The Change Order. The Change Order is the instrument by which adjustments in the Contract Sum and the Contract Time are affected. The Change Order shall be accompanied by a breakdown as set forth in Paragraph 3.4.7.4. The breakdown is for the purpose of enabling the Design Professional and the Board to make a judgment on the dollar amount of the adjustment in the Contract Sum and is not a part of the Change Order. No condition, term, qualification, limitation, exception, exemption, modification, or proviso, except as set forth in this Part, shall appear in the breakdown. Only such conditions, terms, qualifications, limitations, exceptions, exemptions, modifications, and provisos as are permitted under this Part are valid. The Design Professional shall certify to the dollar amount and description of the adjustments permitted by the Change Order.
- 3.4.4.1.1 Construction Contingency Change Orders. Each adjustment to the Construction Contingency shall be subject to the provisions of this Section.
- 3.4.4.2 Execution of Change Orders. Change Orders shall be signed by the CMR, ordinarily certified by the Design Professional, and approved by the Board. No request for payment by the CMR for a Change Order shall be due, nor shall any such request appear on an Application for Payment, until the Change Order is executed by the Board, and if applicable, for any Change Order that exceeds \$50,000, upon approval by the Board. In the event of emergency (See Section 1.4.4) or significant impact to the Overall Project Schedule, the Board shall direct the Change Order to proceed upon a Force Account until the cost and time is resolved in the manner set forth in Section 3.4.7.3 below:

3.4.4.3. Approval of the Component Change Order by the Board. Pursuant to Board Policy FGG, all Change Orders, including Construction Orders, must be reviewed by the project Architect/Engineer, appropriate District and Program Management staff as designated by the Superintendent before being recommended for further approval. The Superintendent is delegated authority to approve and sign Change Orders which will change the overall amount of a contract by \$50,000 or less, but cannot approve and sign Change Orders in excess of \$50,000 or Change Orders that would exceed the GMP approved by the School Board. All Change Orders which will change the overall amount of a contract by more than \$50,000 or increase the GMP must be documented as a Board Resolution. Upon approval by the Board, a Change Order may be signed by the Board President, the Superintendent, or the Chief Financial Officer. A summary of all approved Change Orders will be provided to the Board of Education quarterly as an information item.

3.4.4.4 Emergency Change Order Approval. Pursuant to Board Policy FGG, Any Emergency Change Order in excess of \$50,000 may be approved by the Superintendent or his/her designated alternate, the Chief Financial Officer or his/her designated alternate, and the Board President or Vice President, signed by all three w.

3.4.4.5 Disagreement between Design Professional and CMR.

3.4.4.5.1 As to Contract Sum. Should the Design Professional disagree with the CMR as to the amount of the adjustment to the Contract Sum and such disagreement is not resolved between them within seven days, the Board, if it desires the Change Order work to proceed, may direct the Work to commence on a proposed Change Order by Force Account authorization.

3.4.4.5.2 As to Contract Time. Should the Design Professional disagree with the CMR as to the amount of the proposed adjustment to the Contract Time and such disagreement not be resolved between them within seven days, the dispute shall be resolved by the Board as set forth in Section 5, Part 2.

3.4.4.5.3 As to Other Disagreements. Should the Design Professional disagree with the CMR as to matters other than Contract Sum or Contract Time, the dispute shall be resolved by the Board as set forth in Section 5, Part 2.

3.4.4.6 Change Order Conditions. All Change Orders are issued under the following conditions and shall contain the following language as appropriate:

3.4.4.6.1 For Lump Sum Change Order: The payment and extension of time (if any) provided by this Change Order constitutes compensation in full to the CMR and its Subcontractors and Suppliers for all costs and markups directly and indirectly attributable to the Change Order herein, for all delays related thereto and for performance of changes within the time stated.

3.4.4.6.2 For Force Account Authorizations (In-part Change Order): If the CMR requests payment on account of the Force Account authorization before the work has been completed, the Board will issue an in-part Change Order. The payment and extension for time (if any) provided by this Change Order constitutes interim compensation to the CMR and its Subcontractors and Suppliers for actual costs and markups directly and indirectly attributable to the Force Account authorization, for all delays related thereto and for performance of changes within the time stated.

3.4.4.6.3 For All Change Orders: No changes or reservations by the CMR to the representations and releases in the Change Order will be allowed. If an agreement is not reached between the CMR and the Board on a Lump Sum or Unit Price Change Order prior to the beginning of the Work, the Board may exercise the option to direct the Change Order Work to proceed based on a Force Account in accordance with Section 3.4.7.3 and a Lump Sum Change Order will be issued to finalize this change. Refusal of the CMR to execute one of a Lump Sum, Unit Price, or Force Account Change Order and proceed promptly with the Work shall be a material breach of this Contract that may be sufficient cause to issue a declaration of default.

3.4.5 All Cost and Time Impacts to be Included. Each Change Order shall include all time and monetary impacts of the change. Failure to include a change in Contract Time or in Contract Sum in Change Orders shall be considered a zero price/zero time Change Order and shall waive any change in Contract Time and Contract Sum. Commencement of Work upon a Change Order is conclusive proof that the CMR accepts the Change Order.

3.4.6 Changes in Contract Time. All Change Orders must, state either that the Contract Time and the Material Completion Date are not changed, or are increased, or decreased by a specific number of Days. The CMR must provide a time impact study utilizing the current progress schedule and provide written justification for the extension to the Design Profession and the Board. The written justification must demonstrate an anticipated actual increase in the time required to complete the Work beyond that allowed by the Contract as adjusted by prior Change Orders to the Contract. No extension to the Contract Time shall be allowed unless the additional or changed Work increases the length of the critical path beyond the Material Completion Date. If approved, the increase in time required to complete the Work shall be added to the Contract Time. The Board may decrease, by Change Order, the Contract Time when an Board-requested deletion from the Work results in a decrease in the actual time required to complete the Work as demonstrable on the critical path of the Construction Progress Schedule.

3.4.7 Determining the Cost to Board for Changes. The cost to the Board of any change shall be determined in one or more of the following ways:

3.4.7.1 Lump Sum. The Change Order cost is determined by mutual agreement as a lump sum amount changing the Contract Sum allowed for completion of the Work. The Change Order shall be substantiated by documentation itemizing the estimated quantities and costs of all labor, materials and equipment required as well as any mark-up used. The price change shall include the cost percent allowed for the CMR's, Subcontractor's and second tier subcontractor's overhead and profit as allowable (See Section 3.4.8).

3.4.7.2 Unit Price Work. The Change Order cost is calculated by using unit prices and calculating the number of net units of Work in each part of the Work that is changed, either as the Work progresses or before Work on the change commences, and by then multiplying the calculated number of units by the applicable unit price set forth in the Contract or multiplying by a mutually agreed unit price if none was provided in the Contract. No additional percentage markup for overhead or profit shall be added to the unit prices as this markup is included within the unit prices subject to the limitations of Section 3.4.8.

3.4.7.3 Force Account. The Change Order cost is accomplished by Force Account in the event the CMR and Design Professional cannot agree on the cost of the Change Order or the cost cannot be reasonably determined prior to beginning the Work.

3.4.7.3.1 A Force Account is the establishment by the Board's Encumbrance Record which includes (a) the Design Professional's description of the scope of work, (b) the maximum dollar amount (Stipulated Maximum Sum) beyond which no changed work may be undertaken, subject to amendment, for funding all costs of the Force Account authorization and subsequent Change Order and (c) the Authorization to commence Work. As the authorized Work progresses, the CMR must maintain accounting of actual costs

incurred in accomplishing the Work. The accounting must include an annotated copy of the Overall Project Schedule to accurately show the status of the Work.

3.4.7.3.2 Actual costs, except as otherwise agreed to in writing by the Board, shall not exceed those prevailing for the trades or crafts, materials, and equipment in the locality of the Project, may include only those items listed as allowable in Section 3.4.9, and shall not include any of the costs listed as not allowable in Section 3.4.10. the CMR shall provide, on a daily basis, such records necessary to define the labor, material, equipment and any other costs necessary to determine the cost of the change to the Work to the Board for verification by the Board. The Board's representative's signature shall only be a verification of the labor, material, equipment and quantities of the work performed, and shall not be construed to be an acceptance of entitlement by the Board to the CMR.

3.4.7.3.3 The Stipulated Maximum Sum shall be based on the estimated cost of the Work and the CMR's allowance for overhead and profit as set forth in Section 3.4.8 below, including any time extension and a reasonable contingency. It shall be the sole responsibility of the CMR to apply in writing to the Board, NOT to the Design Professional, for an increase in the Stipulated Maximum Sum if the total value of the Work is approaching and might exceed the Stipulated Maximum Sum.

3.4.7.3.4 Within thirty days of the conclusion of such Work ordered by Force Account, the CMR and the Board shall arrive at the total lump sum cost for the Change Order. Such lump sum cost shall be incorporated into and finalize the Change Order, and shall reference and close the Encumbrance Record establishing the Force Account.

3.4.7.3.5 In-part Change Order. If the Work performed under a Force Account Authorization extends beyond monthly Applications for Payment, the CMR may request interim payment for Work performed, In such case, the board will issue an in-part lump sum change Order as described in this Section. A lump sum Change Order must be executed before, including Force Account Work on an Application for Payment.

3.4.7.4 Breakdown of Expenditures. The CMR shall review any Board requested or directed change and shall respond in writing within fourteen calendar days after receipt of the proposed change (or such other reasonable time as the Board may direct), stating the effect of the proposed change upon his Work, including any increase or decrease in the Contract Time and Sum. The CMR shall furnish to the Board and the Design Professional an itemized breakdown of the quantities and prices and expenditures for labor and materials used in computing the proposed change in Contract Sum, in a format acceptable by the Board, which shall contain the following elements:

- (a) Restatement of the scope of work of the proposed Change Order.
- (b) Itemized breakdown of items, quantities, unit costs and total costs; application of overhead and profit amounts, and grand total.
- (c) Statement of the CMR in the following exact language:

I do solemnly swear to the best of my knowledge, information, and belief, that the costs shown hereinabove do not exceed current costs for like services or materials in the locality of the Project and, in the case of a Force Account, the costs represented do not exceed the actual costs to the CMR; and that the quantities shown do not exceed actual requirements.

- (d) Signature and title of the person submitting the breakdown of expenditures for the CMR.
- (e) Signature and date of the Contract Compliance Specialist certifying to the following statement to be inserted below the signature of the CMR in the following exact language:

“CERTIFICATION OF CONTRACT COMPLIANCE SPECIALIST

I have checked the quantities in the above breakdown of expenditures and certify that they are, to the best of my knowledge and belief, reasonable and accurate.”

Portions of work that are to be deleted as a part of an overall change description shall be clearly reflected in the break-out; abbreviated descriptions which reflect only the net effects of reduced work scopes combined with increased work scopes will not be accepted. The Design Professional and Board shall have full discretion in determining what measure of breakout and support is adequate and acceptable. No extension of Contract Time will be allowed for Construction delays attributable to the failure on the part of the Contractor to provide properly prepared and supported change proposals.

3.4.8 Overhead and Profit for Change Orders.

3.4.8.1 Overhead and Profit. Subject to the limitations described herein, the percentage for overhead and profit to be used in calculating the Change Order Sum (See Section 3.4.7.2 regarding unit prices) shall not exceed the percentages for each category listed below. Said percentages for overhead and profit shall be applied only on the net cost of the Changed Work (i.e., the difference in cost between original and revised Work).

3.4.8.1.1 Work Performed Directly by CMR. If the CMR does all or part of the changed Work with employees that work directly for the CMR (self-performs), its markup for overhead and profit on such changed Work shall not exceed fifteen percent (15%) of the net Allowable costs, if any. CMR shall not be allowed any additional markup including but not limited to the markup contemplated in Section 3.4.8.1.2 below.

3.4.8.1.2 Work Performed Directly by Subcontractor. If a Subcontractor does all or part of the changed Work with employees that work directly for the Subcontractor, the Subcontractor's markup for overhead and profit shall not exceed fifteen percent (15%) of his net Allowable Costs. Under this contract, the forces of a subcontractor of a subcontractor are deemed to be and are the forces of the subcontractor and the total management markup for overhead and profit for all tiers of subcontractors shall not exceed in the aggregate fifteen percent (15%) of the net Allowable Costs of the subcontractor who performs the work. The CMR's allowable management markup for overhead and profit shall not exceed a total of five percent (5%) of the amount due to the Subcontractor (including Subcontractor's overhead and profit).

3.4.8.1.3 Second and Lower Tier Subcontractors. Under this contract, the forces of a subcontractor of a subcontractor are deemed to be and are the forces of the subcontractor and the total management markup for overhead and profit for all tiers of subcontractors shall not exceed in the aggregate twenty (20%) of the net Allowable Costs of the subcontractor who performs the work.

3.4.8.2 The above percentages shall be applied to the net Allowable Costs, if any, as limited and defined in this Part. If the net difference between Allowable Costs and credits to the Board results in a decrease in the Board's cost, the amount of credit allowed the Board shall be the net decrease without any allowance for profit and overhead. Other than any eligible Time Dependent Overhead Costs, all costs that are not Allowable Costs in Article 3.4.9 or are disallowed in Article 3.4.10 shall be considered as overhead and shall be exclusively compensated in the allowances provided for in paragraph 3.4.8.1 above.

3.4.8.3 Limitation of Overhead and Profit to CMR. In reference to Paragraphs 5 and 6 of the Agreement and Section 3.4.8.1 and Section 3.4.7.2 above, the CMR shall not be allowed an additional markup for overhead and profit on any change Order. The Change Order Sum of approved Change Orders and payments shall be identified and accounted for separately on Schedule of Values, Applications for Payment, GMP Change Order and other project documentation.

3.4.9 Allowable Costs for Changes in the Work. Allowable cost for changes to the Work are limited to the following:

3.4.9.1 Labor costs for employees directly employed in the change in the Work, including salaries and wages plus the following costs associated with labor costs:

3.4.9.1.1 Cost of payroll charges, which may include but shall be limited to all demonstrated local, State, and Federal payroll burdens, and insurance premiums.

3.4.9.1.2 Fringe benefits, including personal time off, which may be represented by a pre-approved payroll burden percentage, which must be derived from fringe benefits demonstrated to have been in place on the date 75 days prior to date on which the Board approves the award of the CMR Contract. In no event shall costs for fringe benefits in excess of 10% be allowable; the cost for any fringe benefits above this percentage shall be borne by the CMR.

3.4.9.1.3 Overtime premiums, if such premiums are explicitly authorized by the Board, set at rates established in the manner set forth in the Contract Documents. In no event shall overtime premiums in excess of those required by law be allowable.

3.4.9.1.4 Prior to any payment for any labor cost, the manner by which all burden rates and costs associated with labor costs are derived must be demonstrated to the satisfaction of the Design Professional and the Board.

3.4.9.2 Materials incorporated into the change to the Work, including costs of transportation, handling, fuel, and on-site storage, if applicable.

3.4.9.3 Equipment incorporated in the changed Work or equipment used directly in accomplishing the Work. If the equipment is rented expressly for accomplishing the change in the Work, that cost shall be the rental rate according to the terms of the rental agreement, which the Board shall have the right to approve, or shall be set at rates established in the manner set forth in the Contract Documents. The decision of the Board shall be final, binding, and conclusive on all parties.

3.4.9.4 Costs of increases in premiums for the CMR's Payment Bond and Performance Bond, provided coverage for the cost of the change in the Work results in such increased costs. Prior to requesting payment for the Change Order work, the CMR shall provide proof of the Surety's agreement to include such change in its coverage. The cost of the increase in premium shall be an allowable cost but shall not be marked up. In no event shall a cost in excess of two percent of the cost of the change be allowable.

3.4.9.5 Sales, consumer, use, and other applicable taxes that are legally in effect at the time the change order is approved.

3.4.9.6 Any other costs directly attributable to the change in the Work, such as professional engineering costs, except those set forth in Articles 3.4.8 and 3.4.10.

3.4.9.7 The Board may require any or all of the following documentation to be provided by the CMR to support the Allowable Costs:

- (a) certified payroll records showing the name, classification, date, daily hours, total hours, rate, and extension for each laborer, foreman, supervisor or other worker;
- (b) equipment type & model, dates, daily hours, total hours, rental rate or other specified rate, and extension for each unit of equipment;
- (c) invoices for materials showing quantities, prices, and extensions;
- (d) daily records of waste materials removed from the Site and/or fill materials imported to the Site;

- (e) certified measurements of over excavations, piling installed and similar work; and/or
- (f) transportation records for materials, including prices, loads, and extensions.

3.4.10 Costs Not Allowable for Changes in the Work. Costs not allowable under any circumstances are as follows:

3.4.10.1 Costs due to the negligence of the CMR, Subcontractors, or other persons for whom the CMR is responsible, including but not limited to costs of delay, costs for the correction of Non-Compliant Work, costs for improper disposal of material, costs for equipment wrongly supplied, costs for the CMR's delay in performing the Work, or costs for delay in ordering and obtaining normally available materials or equipment.

3.4.10.2 Home office expenses, including payroll costs for the CMR's or any Subcontractors' officers, executives, administrators, accountants, counsel, engineers, timekeepers, estimators, clerks, and other similar administrative personnel employed by the CMR, whether at the Site or in the CMR's or a Subcontractor's principal or branch office for general administration of the Work (including those referred to as "Eichleay costs"). These costs are deemed overhead included in the percentage markups allowable in Article 3.4.8 above.

3.4.10.3 Home and branch office expenses that include, but are not limited to, expenses of CMR's home and branch offices, CMR's capital expenses, interest on CMR's capital used for the Work, charges for delinquent payments, small tools, incidental costs, rent, utilities, telephone and office equipment, and other general overhead expenses of the home and branch office (including those referred to as "Eichleay costs").

3.4.10.4 Where Work is deleted from the Contract (by Bulletin, Change Order, or otherwise) prior to commencement of that Work without substitution of other similar Work, one hundred percent of the Contract Sum attributable to that Work shall be deducted from the Contract Sum. However, in the event that material submittals have been approved and orders placed for said materials, a lesser amount as justified by proper documentation shall be deducted from the Contract Sum. The credit if any to the Board for reduced premiums on payment bonds and performance bonds shall be in all cases one hundred percent of the credit. If the deductive Change Order affects the critical path or the schedule and it causes an overall reduction in the Contract Time, jobsite time dependent expenses shall be included in the deduction at a mutually agreeable amount or rate.

3.4.10.5 Wages of a superintendent/foreman, if the superintendent/foreman is concurrently supervising other Work at the Site.

3.4.11 Change Order Formats. Formats for Lump Sum Change Orders are in Exhibit H. All Change Orders are issued by the Board.

3.4.12 Changes due to Subsurface or Other Unforeseen Conditions.

3.4.12.1 Subsurface Conditions. Unless the Contract Documents stipulate specific quantities and units of rock or unsuitable soils, the CMR shall assume material below the surface of the Earth to be earth and other material that can be removed by power shovel or similar equipment. Should conditions encountered below the surface of the ground be at variance to the number of unit requirements as indicated by drawings or specifications, and absent an agreed-upon unit price established prior to any Construction Order or GMP Change Order, the Contract Sum and/or time shall be adjusted as provided in the Contract Documents for changes in the work.

3.4.12.2 Other Unforeseen Conditions. If unknown physical conditions are encountered at the Site that differ materially from those indicated in the Contract Documents, then the CMR shall give notice to the Design Professional promptly before conditions are further disturbed, but in no event later than two business days after the first observance of the conditions. The Design Professional shall promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the CMR's cost or time required for performance of any part of the Work, the Design

Professional may recommend an adjustment by Change Order to the Contract Sum or Contract Time, or both. If the Design Professional determines that the conditions at the Site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Design Professional shall so notify the Board and the CMR in writing, stating the reasons. Protest by either party of the Design Professional's decision shall be in accordance with Section 5, Part 2.

3.4.14 RESERVED.

3.4.15 Release of Claims. The execution by the CMR of a Change Order shall be and operate as a release to the Board of all claims by the CMR and of all liability owing to the CMR for all things done or furnished in connection with the Work described in the Change Order. The execution of any Change Order by the Board shall not be an acceptance of any Work or materials not in accordance with the Contract Documents, nor shall it relieve the CMR of responsibility for faulty materials or workmanship or operate to release the CMR or his surety from any obligation arising under the Contract or the Performance Bond or Payment Bond.

3.4.16 Sole Source Designation for Change Order Work.

3.4.16.1 Definition of Sole Source. As used in this Section 3.4.16, "Sole Source" means a Trade CMR or Supplier or Subcontractor specified by name in a Bulletin as the exclusive source from which conforming goods or services may be obtained. Designation of goods or services by reference to a named source accompanied by the qualification "or equal" or similar language is not a designation of a Sole Source as that term is defined herein.

3.4.16.2 Limitations. This Section 3.4.16 applies only to Bulletins referenced in a proposed Change Order that designates a Sole Source that was not designated in the Bidding Documents. Except as stated in this Section, the CMR's inability to obtain payment and performance bonds from Sole Source Subcontractors or warranties from Subcontractors, as required under the Bidding Documents for this Contract, shall not otherwise excuse the CMR from its bonding and warranty obligations under this Contract.

3.4.16.3 Sole Source as Grounds for Rejection of a Change Order. If a Change Order is submitted to CMR for the purposes of adding a Bulletin to this Contract and said Bulletin designates a Sole Source from which CMR is required to procure goods or services necessary to perform the Work, which Sole Source has not been designated previously, CMR shall be entitled to reject the proposed Change Order if the designated Sole Source refuses to provide to CMR the warranties, bonds, terms or schedule required under the Contract Documents, including any warranty or terms or schedule required by Bulletins referenced in the proposed Change Order. In such event, CMR shall give written notice to the Board rejecting the proposed Change Order and, if possible, shall accompany said written notice with a proposal from CMR for changes or modifications to the Bulletin so as to eliminate the Sole Source designation but to achieve goods or services equal in quality or function. The Board may then require the Design Professional to revise the subject Bulletin so as to eliminate the designation of the Sole Source by incorporation of CMR's proposal or otherwise. Upon revision of the Bulletin by the Design Professional and approval thereof by the Board, the Board shall again submit to the CMR a proposed Change Order for the purpose of adding the revised Bulletin to this Contract. If the Board decides to retain the Sole Source in the Change Order and CMR cannot acquire the full contractually required warranties from the Sole Source, CMR shall be held only to the warranty terms and schedule obtainable from the Sole Source.

3.4.16.4 No Excuse Without Notice. If CMR accepts a proposed Change Order adding a Bulletin to this Contract that designates a Sole Source without invoking this Article and putting the Board on notice, CMR shall not be excused from its obligations with respect to the described Work by reason of the refusal of a designated Sole Source to provide warranties as required under this Contract.

3.4.17 Effect of Change Order. A Change Order takes precedence over any inconsistent terms of the Contract Documents pre-existent to the Change Order.

3.4.18 Review of Change Order Proposals.

3.4.18.1 The CMR shall obtain and furnish as back up to the CMR's breakdown a separate breakdown for each subcontractor's charges prepared by each subcontractor on the letterhead of the subcontractor and properly signed by the subcontractor. The Board shall review the CMR's proposal and respond to the CMR within thirty (30) days of receipt.

3.4.18.2 Except in certain limited circumstances which are in each instance at the discretion of solely the Board, the Board will not review, respond, or act upon any Change Order Proposal without a complete and thorough written report from the Design Professional, including authorized signature, regarding all aspects of the proposal, which must include no less than the following information:

- 1) A brief summary description of the subject change.
- 2) A statement fully and clearly describing the subject change, to the extent required beyond any attachments to the written report, which is sufficient for the Board to understand the nature, extent, and scope of the change. All existing documentation relating to the subject change must be cited by date, description, and where applicable, acronym.
- 3) A statement regarding the technical aspects of the subject change, which must include indications that the change if implemented:
 - a. complies with all applicable codes
 - b. is consistent with the intent of the design and the Contract Documents
 - c. should not trigger or instigate the requirement for a subsequent ADD change
- 4) A statement regarding the monetary aspects of the subject change proposal, which must include indications that the change proposal:
 - a. is in strict accordance with all requirements of the Contract Documents, including insofar as mark-ups and allowable costs and expenses
 - b. the information provided by the CMR and all subcontractors and suppliers is presented in sufficient detail and breakdown to support extended figures and dollar amounts
 - c. accurately represents the value of the work scope, including consideration of the estimated date on which the work would be expected to begin, based on the requirements of the Project Schedule
 - d. includes all credits or deducts to which the Board is entitled as a part of the work scope change
 - e. does not include any costs for items that would be redundant to the original Project Work Scope, or to any other Change Order
 - f. does not include any costs related to the effects of weather
- 5) A statement regarding the time aspects of the subject change proposal, which must include indications:
 - a. of the date of the current approved Project Schedule / Project Schedule Revision, and the date it was approved
 - b. regarding the effects of the work scope of the subject change to the Project Schedule and Material Completion, including direct reference to the current approved Project Schedule and to each schedule line item affected by the change
 - c. regarding the effects, both past and future, of the design (as applicable), review, and approval process for the subject change to the Project Schedule and Material Completion, including direct reference to the current approved Project Schedule and to each schedule line item affected by the change
 - d. that the change proposal includes all reductions in Contract Time to which the Board is entitled as a part of the work scope change
 - e. that the change proposal does not include any increases in Contract Time for items that would be redundant to the original Project Work Scope, or to any other Change Order

- f. that the change proposal does not include any increase in Contract Time that are related to the effects of weather, unless the subject change by its description pertains to weather
- 6) A statement as to why the work scope of the subject change was not a part of the original design established by the original GMP design and Contract Documents, and where applicable, as established in a previous Change Order which logically might have included the change under consideration.
- 7) A statement, without regard to the preceding statement, regarding the effect of the work scope of the subject change to the value of the Project, as compared to the value of the same work scope had it been a part of the original GMP design and Contract Documents.
- 8) A statement of opinion and recommendation to the Board as to what action it should take regarding the subject change.

3.4.18.3 Where applicable, the Design Professional's report must include by attachment a report by the Design Professional's Consultants, which, to the extent applicable, must meet the requirements in 3.4.18.2.

3.4.18.4 Except for the recommendation listed in item 8 of 3.4.18.2, the Design Professional may cite and adopt statements within the Consultant report as his own.

3.4.18.5 In the event that the Design Professional believes that a change does not require the full measure of documentation required by 3.4.18.2, it may submit an abridged report which includes no less than the recommendation listed in item 8, and a request that it be deemed sufficient.

3.4.18.6 In the event that in order to maintain construction progress, a change must be implemented in a manner more quickly than the Design Professional (and Consultant(s) when applicable) can prepare a full report as required by 3.4.18.2, it may submit an abridged report which includes no less than the recommendation listed in item 8, with the indication that the full report is forthcoming and the date on which it will be provided.

3.4.18.7 The Design Professional's recommendation, as required by item 10 of 3.4.18.2, must be provided to the Board within seven (7) days of receipt of the CMR's Change Order Proposal.

3.4.18.8 The Board's actions regarding a proposed change, even the execution of a Change Order, shall not imply consent or agreement with the written report from the Design Professional, in part or in whole.

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PART 5 – TIME

3.5.1 Time is of the Essence. Time is of the essence of this Contract and all obligations hereunder.

3.5.2 Competent Management of Time. The CMR has represented to the Board, in order to be awarded this contract, that the CMR is experienced in managing construction in accordance with contract requirements and in a timely manner and that the CMR has included in his proposal sufficient sums to carefully and competently manage this project for completion by the Material Completion Date.

3.5.3 Contract Time.

3.5.3.1 Fair and Reasonable. The CMR has carefully examined and analyzed the Site, the Contract Documents, and all known factors related to his ability to complete this project within the Contract Time stipulated. By submitting his bid for this project, the CMR agrees that the stipulated Contract Time is fair and reasonable.

3.5.3.2 Delays. The parties recognize there may be delays to perform Change Order work in the event that conditions encountered at the Site are different from those indicated in the Contract Documents, or to perform Change Order work to correct errors in the plans and specifications. Execution of any change must be authorized. In such event, there shall be an adjustment in the Contract Sum as provided in the Contract Documents for changes in the Work. The parties agree that such delays are not a ground for claiming extraordinary remunerations except as set forth in this Contract in Section 3.5.8 below.

3.5.3.3 CMR Construction Contingency. It is expected that all the Work covered by the GMP, including that which might be required and funded from the CMR Construction Contingency, is to be Materially Complete on the date stipulated. Except in certain circumstances presented and documented by the CMR, and approved by the Design Professional and Board, changes implemented by CMR Construction Contingency Change Orders shall not increase the Contract Time.

3.5.4 Commencement, Prosecution, and Completion.

3.5.4.1 Commencement, Prosecution, and Completion of Work. The CMR will be required (a) to commence work under this Contract as of the Effective Date of the Contract, (b) to prosecute the work with faithfulness and energy (c) to install the various parts of the work with equal steps shown on the Overall Project Schedule and at the same rate (or better) shown on the Overall Project Schedule and (d) to complete the work within the Contract Time, as adjusted. Commencement of work shall mean beginning the Basic Services. Unless otherwise agreed, and subject to Change Orders, Material Completion of the Project must be achieved on or before the date established as the Material Completion Date.

3.5.4.2 CMR's Acceleration for failure to meet Schedule Requirements. In the event the CMR shall be delinquent in respect to achieving the Milestone dates established in the Overall Project Schedule, CMR shall, within seven (7) days after receipt of written demand of the Design Professional, cause its employees and Subcontractors to perform work at an accelerated pace with hours and days in addition to the normal working hours and working days, as necessary to promptly bring the Work into compliance with the Overall Project Schedule, at no additional cost to the Board. Fulfillment of this requirement as to overtime work shall not relieve the CMR from liability for breach of the covenant as to time. For account of recovery of lost time required of the CMR for its breach of covenant as to time, the CMR shall be entitled to no claim against the Board for any payment, repayment, reimbursement, remittance, remuneration, compensation, profit, cost, overhead, expense, loss expenditure, allowance, charge, demand, hire, wages, salary, tax, cash, assessment, price, money, bill, statement, dues, recovery, restitution, benefit, recoupment, exaction, injury or damages.

3.5.5 Construction Progress Schedule and Overall Project Schedule. (See Sections 2.1.5.2 and 3.7.16.4)

3.5.6 Material Completion Date. The Work under this Contract shall achieve Material Completion by 11:59 PM Eastern Prevailing Time of the date required in the Contract as the Material Completion Date unless extended by approved Change Order.

3.5.7 General Rule – No Damages for Delay, Extension of Time Sole Remedy. Extension of time is the CMR's sole remedy for any delays not the fault of the CMR. CMR shall not be entitled to any damages for delay or to any other reimbursement as a Cost of the Work, or to an increase in the Contract Sum, or to payment, damages, monies, or compensation of any kind from Owner for direct, indirect, impact, or disruption damages (including but not limited to costs of acceleration of Work or any Phase thereof) arising because of delay or other hindrance of any kind whatsoever; except as specifically permitted by Section 3.5.8.

3.5.8 Types of Delay – Compensable. The extension of the Contract Time and the adjustment to the Contract Sum specifically provided for in this Article shall be CMR's sole and exclusive remedy for delays, hindrances, interferences or resulting inefficiencies and re-sequencing.

3.5.8.1 Compensable Delay – Unavoidable Delay.

3.5.8.1.1 Delay by Board or Design Professional. If the CMR is delayed in the progress of the Work by an act or neglect of the Board, Board's employees, Design Professional or Separate CMRs employed by the Board, or by labor disputes not reasonably anticipated, or by other causes beyond the CMR's control which the Board determines are the fault of the Board or the Design Professional and may justify delay, then the Contract Sum may be adjusted and the Contract Time may be extended by Change Order for such reasonable time as the Board may determine; provided, however, that (i) such delays extend the Overall Project Schedule's critical path; (ii) the CMR has taken all reasonable actions to mitigate the effects of the delay on the Work; (iii) the fault or negligence of the CMR, the CMR's agents or employees did not materially contribute to such causes; and (iv) the CMR shall have notified Board of the cause or causes of such delay within fourteen days from the date on which the CMR first becomes aware of such delay. Extension of time and compensation for compensable delay are to be processed as a Change Order pursuant to Sections 3.4.6 and 3.4.7.

3.5.8.1.2 Delay in Responses to Submittals. Any claim by CMR for a change in the Material Completion Date due to delay of responses to submittals that materially affect the completion of the Work by lengthening the critical path of the Construction Progress Schedule may be made during the time while the failure of the Design Professional to act or perform continues, or within seven days after such failure to act or perform has been cured. If no Submittal Schedule or agreement as required in Section 2.1.5.2 is agreed upon, then a claim for delay will be allowed only after the Design Professional has been allowed twenty-one (21) days to take action. Any claim for extension of time must be reasonable and take into consideration the nature of the submittal. This provision shall apply only to those submittals that are made in a timely manner, and in accordance with the approved submittal schedule.

3.5.8.1.3 To be Processed as a Part of the Change Order Process. Extensions of Time and adjustments to the Contract Sum for compensable Unavoidable Delay are to be processed as a Change Order pursuant to Section 3, Part 4.

3.5.8.2 Compensable Delay – Certain Change Orders.

3.5.8.2.1 Board-Requested Changes. If the Board requests changes in the Contract Documents that would materially affect the completion of the Work by lengthening the critical path of the Overall Project Schedule, the Design Professional shall recommend the appropriate number of additional days to be considered in the Change Order. The CMR expressly agrees that any monetary remedy associated with such extensions of time shall be no greater than the actual direct costs incurred by the CMR.

3.5.8.2.2 Other Change Orders. For Change Orders involving the following situations that would materially affect the completion of the Work by lengthening the critical path of the Construction Progress Schedule, the Design Professional shall recommend the appropriate number of additional days to be considered in the Change Order. CMR agrees that any monetary remedy associated with such extensions of time shall be no greater than the actual direct costs incurred by the CMR.

- (a) Changes due to Subsurface or Other Unforeseen Conditions, Section 3.4.12.
- (b) Changes for Compensable Rock, Section 3.4.13.
- (c) Changes deleting work, Section 3.4.10.4

3.5.8.2.3 To be Processed as a Part of the Change Order Process. Extensions of Time and adjustments to the Contract Sum for any of the compensable change order delays set forth in this Section 3.5.8.2 are to be processed as a part of each Change Order pursuant to Section 3, Part 4.

3.5.8.3 Compensable Delay – *Force Majeure*. If, between the Proceed Order and the Material Completion Date, as amended, the CMR is unable to perform or is delayed in the performance of any of the terms and provisions of this Contract, that materially affects the completion of the Work by lengthening the critical path of the Construction Progress Schedule, as a result of (i) governmental preemption of materials in connection with a national emergency declared by the President of the United States; (ii) riot, insurrection, acts of terror or terrorism or other civil disorder affecting performance of the Work; or (iii) labor strikes that could not be reasonably anticipated by the CMR, (iv) suspension of work due to government shelter-in-place orders resulting from COVID-19 or another epidemic or pandemic or the suspension of work by agreement of the Contractor and Owner because of the outbreak of COVID-19 or another illness among workers on the project; (v) earthquakes, hurricanes, tropical storms, or unusual and extreme weather conditions constituting Acts of God, then, and in any such event, such inability or delay shall be excused, and the time for completing the affected portions of the Project (and the entire Project, if applicable) shall be extended for such reasonable period of time as the delay has affected the critical path of the performance of the Work hereunder.

3.5.8.3.1 Mitigation of Delay. CMR shall take all reasonable actions to minimize the delay caused by any of the above factors, and shall notify Board in writing with a copy to the Design Professional of any event allowing for excuse or delay not later than seven (7) days after the CMR first becomes aware of the event, or should have become aware, of the event; otherwise CMR will be deemed to have waived the excuse or delay.

3.5.8.3.2 To be Processed as a Part of the Change Order Process. Extensions of Time and adjustments to the Contract Sum for *Force Majeure* are to be processed as a Change Order pursuant to Section 3 Part 4. No adjustment to the Contract Sum will be allowed.

3.5.8.5 Protest. The Design Professional's decision as to abnormal weather delay shall be subject to protest by either the CMR or the Board as set forth in Section 5, Part 2.

3.5.9 Types of Delay - Non-Compensable. CMR understands, acknowledges and agrees that delays occasioned by the events and occurrences set forth below are not compensable delays and do not constitute reason for extending the Date for Material Completion. It is CMR's responsibility to make adequate provision for the following in scheduling the Work:

3.5.9.1 Delay in Delivery of Materials or Equipment. Delay in delivery of materials or equipment for any cause other than those specified in Section 3.5.8.3. No claim will be approved if materials or equipment are delayed due to CMR's tardy procurement or expediting.

3.5.9.2 All Other Delay. All delay not covered in Section 3.5.8.

3.5.10 Submission of Claims for Compensable Delay, Extending the Material Completion Date.

3.5.10.1 Time for Submission. Except as specified below, any claim by CMR for a change in the Contract Time or the Substantial Completion and Occupancy Date shall be made within fourteen (14) days of the day on which the CMR becomes aware of the event on which the claim is based or, if the Contract Documents specify a shorter or longer period with respect to such event, within the period specified by the Contract Documents.

3.5.10.2 Delay Claim Must Be In Writing. Any claim to extend the Contract Time and Substantial Completion and Occupancy Date must be in writing, must set forth in detail the basis for the claim and the number of days of delay claimed, must be correlated with the approved Overall Project Schedule, must be executed by the CMR and delivered to the Design Professional and the Board, and must be reviewed and an appropriate time assessed by the Design Professional.

3.5.10.3 When Delay Claim Deemed Waived. Any claim to extend the Contract Time and Substantial Completion and Occupancy Date not made in writing to Board within the above time periods shall be deemed waived and shall not thereafter be valid. In the case of a continuing delay as a result of a single event, only one claim submission is necessary.

3.5.11 Recovery of Schedule Delays.

3.5.11.1 Recovery of Schedule Delays. If the Design Professional determines that the Project is one week or more behind schedule, per the approved Overall Project Schedule, the Design Professional shall so notify the CMR in writing. Within seven days of the date of the Design Professional's notice, the CMR shall deliver to the Design Professional and Board a written plan explaining how the CMR intends to bring the Project back on schedule. The CMR's plan must provide sufficient detail to allow the Design Professional and Board to determine the proposal's feasibility.

3.5.11.2 Recovery of Schedule Delays During Last Sixty (60) Days of Contract Time. At any time during the last sixty (60) days of the Contract Time that the Design Professional finds that the CMR is behind schedule per the Contract Time, as amended, the Design Professional shall notify the CMR in writing. Within seven (7) days of the date of the Design Professional's notice, the CMR shall prepare and deliver to the Design Professional and Board a written plan explaining how the CMR intends to bring the Project back on schedule. The CMR's plan must provide sufficient detail to allow the Design Professional and Board to determine the proposal's feasibility.

3.5.11.3 Payment of Costs of Recovery of Schedule Delays. Costs attributable to recovery of schedule delays, after execution of the GMP Change Order, may be paid from the Construction Contingency.

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PART 6 – CORRECTING THE WORK; INSPECTIONS, COVERING AND UNCOVERING WORK

3.6.1 Duty to Promptly Correct Work. The CMR shall promptly correct Work rejected by the Design Professional or Board or known by the CMR to be defective, damaged, or failing to conform to the requirements of the Contract Documents, whether observed before or after Material Completion and whether or not designed, fabricated, installed, or completed. The CMR shall bear costs of correcting such rejected Work, including without limitation additional testing and inspections.

3.6.1.1 Full and Complete Charge. Notwithstanding the provisions of this Contract, and until Material Completion, the CMR shall have full and complete charge and care of the Work or any portion thereof (including the Board-furnished supplies, material, equipment, or other items to be utilized or incorporated in the Work). After Material Completion is achieved, the CMR shall remain in complete charge and care of the items remaining to be completed on the initial Punch List and Permitted Incomplete Items until all are accepted by the Board on or before Final completion.

3.6.1.2 Make Good Losses. The CMR shall rebuild, repair, restore, and make good losses of, and injuries or damages to, the Work or any portion thereof (including the Board -furnished supplies, material, equipment, or other items to be utilized with, or incorporated in, the Work and that are at the Site) before Material Completion of the Work. Such rebuilding, repair, or restoration may be paid from the Construction Contingency; provided, however, that the Board will make available applicable proceeds from the Builders' Risk policy required by the Contract Documents.

3.6.1.3 No Limitation. Nothing contained in this Part shall be construed to establish a period of limitation with respect to the CMR's obligations to correct defective or non-conforming Work under this Contract, at law or in equity.

3.6.2 Correcting the Work.

3.6.2.1 Notice of Non-Compliant Work. A Notice of Non-Compliant Work shall be in writing, shall be dated, shall be signed by the Design Professional, shall be addressed to the CMR with a copy to the Board, and shall contain three (3) elements as follows:

3.6.2.1.1 Description of Work.

- (a) that has been omitted; or
- (b) that is unexecuted as planned in the Overall Project Schedule; or
- (c) that has not been executed in accordance with the methods and materials designated in the Contract Documents.

3.6.2.1.2 Contract References: Citation of the provision or provisions of the Contract Documents which specify the Work to be executed.

3.6.2.1.3 Time for Compliance. Fixing of a reasonable space of time within which the CMR shall have made good the deficiency (which said space of time shall not be deemed to be an extension of Contract Time, nor shall it be deemed to be authorization for amendment to the Overall Project Schedule).

3.6.2.2 Failure to Supply Workmen or Materials or to Prosecute the Work. A Notice of Non-Compliant Work may be issued for failure of the CMR to supply enough workers or enough materials or proper materials to prosecute the Work. A Notice of Non-Compliant Work in such event may be based deficiencies in management of time.

3.6.2.3 Removal and Making Good of Non-Compliant Work. The CMR shall remove from the Site within the space of time designated in Notice of Non-Compliant Work all work determined by the Design Professional as failing to conform to the contract, whether incorporated in the work or not, and the CMR shall promptly replace and re-execute the work in accordance with the Contract and without expense to the Board and shall bear the expense of making good all work of other

contractors destroyed by such removal or replacement. The CMR shall supply any omitted work and perform all unexecuted work within the space of time fixed by the Design Professional in Notices of Non-Compliant Work.

3.6.2.4 Remedy of the Board for Breach of Notice of Non-Compliant Work.

3.6.2.4.1 Failure to Make Good a Deficiency. If the CMR does not make good a deficiency within a reasonable space of time fixed in a Notice of Non-Compliant Work, the Board may do any of the following:

(a) Remove the Non-Compliant Work and store it at the expense of the CMR. If the CMR does not pay the expenses of such removal and storing within ten days after receipt of written demand of the Board, the Board may upon three days' notice in writing to the CMR sell such materials at private sale or at auction and shall account for the net proceeds thereof after deducting all proper costs incurred by the Board.

(b) Supply omitted work, perform unexecuted work, or replace and re-execute work not done in accordance with the methods and materials designated in the Contract Documents, and deduct the cost thereof from any payment then or thereafter due the CMR. The Design Professional shall approve the amount charged to the CMR.

3.6.2.4.2 Other Remedies. The remedies stated in this article are in addition to the remedies otherwise available to the Board, do not exclude such other remedies, and are without prejudice to any other remedies. Time limits stated in Notices of Non-Compliant Work are of the essence of the contract. Unless otherwise agreed to by the Board in writing, the making good of Non-Compliant work shall physically commence at the Site in not more than seven days after receipt of the Notice of Non-Compliant Work, except that in case of emergency correction shall physically commence at the Site at once, and except that the CMR shall in any event physically commence the correction at the Site early enough to complete within the space of time allowed in the Notice of Non-Compliant Work. The Board shall give prompt consideration to reasonable requests for delay in commencement of the making good of Notices of Non-Compliant Work. The making good of Non-Compliant work shall be completed within the space of time allowed in the Notice of Non-Compliant Work unless the CMR shall have requested from the Design Professional an increase in the amount of time allowed and the Design Professional shall have given notice to the CMR in writing, with copy to the Board, stating the additional amount of time, if any, allowed.

3.6.2.5 Notice of Correction from CMR. The CMR shall give prompt notice in writing to the Design Professional, with copy to the Board, upon completion of the correction of the Non-Compliant work. In the absence of such notice, it shall be and is presumed under this Contract that there has been no correction, supplying remedy, or performance of unexecuted work.

3.6.2.6 The Board's Right to Correct Work. If the CMR should neglect to prosecute the Work properly or fail to correct Non-Compliant Work or fail to perform any provision of this Contract, the Board, after three days' written notice to the CMR, may without prejudice to any other remedy he may have (including without limitation remedies against the CMR's surety), make good the deficiencies and may deduct the cost thereof from the payment then or thereafter due the CMR.

3.6.3 No Delay. Work requiring correction shall be corrected immediately and shall be carried out in such a way not to delay the completion of the Project. If it is not feasible to correct said work immediately, the corrective work shall be done on a schedule acceptable to the Board .

3.6.4 Effect of Notice of Non-Compliant Work. Notwithstanding anything contained in the Contract Documents to the contrary, in order to minimize delays in the completion of the Project, the CMR shall

continue working while responding to a Notice of Non-Compliant Work and shall continue working while protesting any decision by the Design Professional or the Owner.

3.6.5 Deductions for Uncorrected Work. If the Design Professional and board deem it inexpedient to correct work injured or done not in accordance with the contract, an equitable deduction from the contract price will be made therefore and confirmed by execution of a lump sum Change Order. There is no duty on the part of the board, however, to accept any work injured or done not in accordance with the methods and materials designated in the contract documents, nor does the CMR have the right to demand that there shall be acceptance of work injured or done not in accordance with the methods and materials designated in the Contract Documents.

3.6.6 Inspection of Work.

3.6.6.1 Access to Work. At all times, the Design Professional and his representatives shall have access to the work wherever it is in preparation or progress, and the CMR shall provide proper facilities for such access and for inspection.

3.6.6.2 Notice to Design Professional from CMR Prior to Covering Work. If the specifications, the Design Professional's instructions (either in the specifications or issued later in writing), laws, ordinances, or any public authority require any work to be specially tested or approved, the CMR shall give the Design Professional timely notice in writing of its readiness for inspection and, if the inspection is by any authority other than the Design Professional, will tell the Design Professional the date fixed for such inspection. Inspections by the Design Professional shall be made promptly and, where practicable, at the source of supply. If any work should be covered without approval or consent of the Design Professional, said Work must, if required by the Design Professional, be uncovered for examination at the CMR's expense.

3.6.6.3 Fire Marshal Inspections.

3.6.6.3.1 General. The State Fire Marshal or local fire inspectors may make inspections at any time. It shall be the responsibility of the CMR to request an inspection at 80% completion and at 100% completion and to give notice when all items on the 100% inspection report have been completed. Requests shall be in writing with a copy to the Board and Design Professional.

3.6.6.3.2 Inspections Defined. The basic definitions for 80% and 100% inspections are as follows:

(a) 80% Inspection: The structural components are in place and open for review of the fire safety components. NOTE: Structural components include the following: fire walls, vertical shafts, stairways, smoke stops, hazardous area separation, roof and ceiling assemblies, corridor and door width, and HVAC system.

(b) 100% Inspection: The CMR has completed all of the items on the eighty percent (80%) inspection report and has the certificate of occupancy in hand.

3.6.6.4 False Start. In the event the CMR shall have issued notice of readiness prematurely, his action shall be deemed to be a "false start." The CMR shall be liable for the damage resulting from the aforesaid false start, including, but not limited to, the salary, professional fees, and travel and living expenses of the person or parties inconvenienced by the aforesaid false start.

3.6.6.5 Certificate of Occupancy. The CMR's obligation under the Contract is to install the Work in accordance with the Contract Documents, obtain the Certificate of Occupancy from the State Fire Marshal, his deputy, or local fire inspectors and forward it to the Design Professional as a part

of the final close out procedures. The Design Professional's obligation is to design the Work to comply with the applicable codes and to qualify for a Certificate of Occupancy.

3.6.7 Covering and Uncovering Work.

3.6.7.1 Re-examination or Re-testing of Work Covered Pursuant to Consent of Design Professional. Re-examination or re-testing of questioned Work previously covered pursuant to consent of the Design Professional may be ordered by the Design Professional. If so ordered the Work must be uncovered by the CMR. The Board shall pay the cost of re-examination and replacement or of re-testing if such Work is found in accordance with the Contract Documents. The CMR shall pay such cost if such Work is found not in accordance with the Contract Documents unless the CMR can show that a Separate CMR caused the defect in the Work. In that event, the Board shall pay such cost. Re-examination or re-testing under the terms of this Paragraph applies only to Work that has been covered with consent of the Design Professional. Work covered without consent of the Design Professional must be uncovered for examination as provided below.

3.6.7.2 Re-examination or Re-testing of Work Covered Without Consent of Design Professional. If any Work should be covered without approval or consent of the Design Professional or contrary to any provision of the Contract Documents, such Work must be uncovered for examination by the Design Professional at the CMR's expense. The CMR shall be liable for the costs resulting from the aforesaid uncovering, including, but not limited to, the salary, professional fees, and travel and living expenses of the person or parties inconvenienced thereby.

3.6.8 Inspection Does Not Relieve CMR. Under the Contract Documents, the CMR acknowledges that it has the responsibility for furnishing all services, labor, supplies, and materials for the entire Work in accordance with such documents. No provisions of this article nor any inspection of the Work by the Board, representatives of the Board, the SCCPSS, Contract Compliance Specialist, clerk-of-the-works, engineers employed by the Design Professional, representatives of the Design Professional, or the Design Professional shall in any way diminish, relieve, or alter said responsibility and undertaking of the CMR. Neither shall the omission of any of the foregoing to discover or to bring to the attention of the CMR the existence of any Work or materials injured or done not in accordance with said Contract Documents in any way diminish, relieve, or alter such obligation of the CMR nor shall the aforesaid omission diminish or alter the rights or remedies of the Board as set forth in the Contract Documents. The Contract Compliance Specialist has no power to make decisions, to accept or reject work, or to consent to the covering of Work. The Contract Compliance Specialist owes no duty to the CMR.

3.6.9 Board May Require Uncovering of Work. The Board may require any Work to be uncovered, whether or not prior information was provided as to the schedule for covering. Should work so uncovered prove to be in noncompliance with the Contract Documents or the Construction Documents, the cost of uncovering, correction of the Work, recovering, and any schedule recovery costs shall be borne by the CMR and may be paid from the Construction Contingency. However, if the CMR complies with the notice requirements above, and the Board fails to make its desired inspections, and the Board then requires the CMR to uncover the Work, the Board shall bear all additional costs of uncovering and recovering the Work unless the Work is found to be non-compliant with the Construction Documents, in which case the CMR shall bear all such uncovering and recovering costs, which may be paid from the Construction Contingency. Should the work be compliant, however, the Board will pay for the uncovering and repair of the affected work, in addition to any delay that affects the critical path of the Project.

3.6.10 Board May Pay for Uncovering Work. Should the Board require work to be uncovered contrary to the Contract Documents and the Construction Documents, the Board shall compensate the CMR for any extra cost caused the CMR, including any cost of schedule recovery.

3.6.9. Effect of Notice of Non-Compliant Work. Notwithstanding anything contained in the Contract Documents to the contrary, in order to minimize delays in the completion of the Project, the CMR shall continue working while responding to a Notice of Non-Compliant Work and shall continue working while protesting any decision by the Design Professional or the Owner.

3.6.10 Deductions for Uncorrected Work. If the Design Professional and Owner deem it inexpedient to correct work injured or done not in accordance with the contract, an equitable deduction from the contract price shall be made therefore and confirmed by execution of a lump sum Change Order. There is no duty on the part of the Owner, however, to accept any work injured or done not in accordance with the methods and materials designated in the contract documents, nor does the CMR have the right to demand that there shall be acceptance of work injured or done not in accordance with the methods and materials designated in the Contract Documents.

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PART 7 – TRADE CONTRACTORS; SELF-PERFORMANCE

3.7.1 Parties. Trade Contracts shall be between the CMR and the Trade Contractor or Trade Supplier selected by CMR, as CMR deems appropriate, subject to the requirements that such Trade Contract be awarded in accordance with the procedures set forth in this Part.

3.7.2 Selection.

3.7.2.1 Selection Process. All Trade Contracts between CMR and Trade Contractors or Trade Suppliers shall be entered into only after the CMR's completion of the selection process required by this Section 3, Part 7. For each selection, CMR, in consultation with the Design Professional and the Board, shall develop appropriate selection criteria for the selection of the Trade Contractor or Trade Supplier. The cost of the work shall be a factor for consideration in every selection, but may not necessarily be the determining factor. (See Sections 1.7.9, 1.7.10, and 3.7.13).

3.7.2.2 Information for Proposed Firms. CMR shall develop information for proposed firms for all of the Work. Such information shall describe the Work to be procured by the CMR through Trade Contractors or Trade Suppliers, using CMR's own forms and procedures. Firms shall be required to submit a proposal encompassing the full contract price for the Work to be procured, except as provided in Section 3.7.11 below.

3.7.2.3 Alternative Prices. With the approval of the Board, the CMR shall be entitled to take alternative prices as it deems necessary to advance the Work. The Board shall not unreasonably withhold such approval.

3.7.3 Proposers Lists. Prior to each solicitation of proposals, the CMR shall prepare and submit to the Board for review a list of recommended proposers. CMR may require prospective proposer to undergo a pre-qualification process to permit CMR affirmatively to determine that a proposer who desires to submit a proposal is a responsible proposer as defined in Section 3.7.5.

3.7.4 CMR Proposal Review. Upon receipt of proposals and prior to CMR's acceptance of any proposal, CMR shall prepare and deliver to the Board for its review a complete and thorough analysis of the proposals received. Such proposal analysis shall clearly indicate the apparent best proposal from the proposer or proposers determined by CMR to be responsible and responsive and shall be accompanied by a copy of each proposal received. Nothing herein requires CMR to select the lowest price proposal. The risk and cost of CMR's selection of a successful proposer lies exclusively with CMR.

3.7.5 Responsible Proposers. CMR shall affirmatively determine whether each proposer is or is not responsible and whether each proposal is or is not responsive. To be deemed a responsible proposer, the proposed Trade Contractors or Trade Suppliers shall match the following criteria:

3.7.5.1 Qualified. Be reputable, skilled, reliable, competent, qualified in the trade or field in which they are to perform on the Project, and be thoroughly familiar with applicable codes.

3.7.5.2 Bonding. Have the ability to obtain bonding from a bonding company acceptable to CMR.

3.7.5.3 Insurance. Shall have or shall have the ability to obtain insurance required by the Contract Documents.

3.7.6 Board Rights. The Board reserves the right in its sole and absolute discretion to require CMR to reject any Trade Supplier or Trade Contractor and any proposal. If after the acceptance of the GMP Change Order by the Board, the Board exercises its right to require CMR to reject a Trade Contractor, a Trade Supplier, or the lowest price proposal submitted by a responsible proposer, the acceptance of which CMR recommends, CMR shall recommend an acceptable substitute Trade Contractor, Trade Supplier, or proposer, and if the substitute Trade Contractor, Trade Supplier or proposer has submitted a higher proposal or price, the GMP Change Order and its Estimated Cost Component shall be adjusted to reflect the difference between the amount of the rejected proposal or price and the higher accepted proposal or price.

3.7.7 CMR Award. Unless the Board exercises its rights under Section 3.7.5, CMR shall award the Work to a responsible Trade Contractor or Trade Supplier of CMR's choosing and proceed with the preparation of a purchase order or Trade Contract incorporating all necessary terms and conditions of the Contract Documents. Upon execution by CMR, and if requested by the Board, CMR shall send a copy of the executed purchase order or Trade Contract to the Board.

3.7.8 CMR Self-Performance.

3.7.8.1 Conditions. After the acceptance of the GMP Change Order by the Board, and in the event the lowest responsible and responsive proposal received by CMR exceeds CMR's adjusted Construction Budget line item for such Work, or in the event that no proposal is received, and any permitted redesign does not eliminate the budget shortfall or result in the submission of an acceptable proposal, the CMR has the following options: (i) In the case where the lowest responsible and responsive proposal exceeds the line item budget, and with the prior approval of the Board, the CMR may perform such Work with its own forces for the lump sum amount stated in its line item budget for such Work in its current Construction Budget; or (ii) In the case where no responsible and responsive proposal is received, the CMR shall perform such Work with its own forces within the Guaranteed Maximum Price stated in the GMP Change Order for the lump sum amount stated in its line item budget for such Work in its current Construction Budget. CMR's line item budget for Work stated in its current Construction Budget shall be deemed to be a proposal submitted by the CMR for such Work. No action permitted under this Paragraph shall increase the Guaranteed Maximum Price.

3.7.8.2 Default of Trade Contractor. In addition, CMR may with its own forces perform Work encompassed within any Trade Contract between CMR and any Trade Contractor upon the termination of such Trade Contract by CMR by reason of the default or abandonment of the Work by the Trade Contractor but, the CMR shall perform such Work or the balance thereof remaining at the time of termination for an amount not exceeding the contract sum specified in the Trade Contract or the unexpended balance thereof remaining at the time of termination but CMR's Fee shall not be reduced or increased on account of the Work performed.

3.7.8.3 Other Compelling Circumstances with Specific Approval of Board. In certain compelling circumstances, upon the request of the CMR and the recommendation of the Design Professional, Board may permit, in its sole and unfettered discretion where such approval is in the best interest of the Board, CMR to perform specified work with its own forces. CMR's line item budget for such Work stated in its current Construction Budget, or less, shall be deemed to be a proposal submitted by the CMR for such Work for which, in accordance with this Paragraph and subject to approval by Board, the CMR will undertake to perform on a lump sum basis. CMR shall not be entitled to any additional CMR Fee calculated on such lump sum. No action permitted under this Paragraph shall increase the Guaranteed Maximum Price.

3.7.9 Duty to Continue Work. Notwithstanding any dispute between the Board and CMR or between CMR and any Trade Contractors or between such Trade Contractors, it shall be the responsibility of CMR to continue to prosecute all of the Work and perform all of its services diligently in a good and Workmanlike manner in conformity with this Contract, and the CMR and/or Trade Contractors shall have no right to cease performance hereunder or to permit the prosecution of the Work to be delayed so long as Board does not default hereunder. So long as the CMR continues performance under this Contract, the Board shall continue to pay CMR in accordance with this Contract.

3.7.10 Alternative Price Terms. Notwithstanding the requirements of Sections 3.7.2 and 3.7.12, CMR shall be permitted, with Board's advance approval and in Board's sole discretion, to seek Trade Contractors or Trade Suppliers who meet the requirements of this Section, through a proposal process under which the proposed Trade Contractor or Trade Supplier offers to provide Construction Management services for designated subcomponents of the Project and, with the Board's approval, CMR may enter such contracts for the furnishing of such systems on a guaranteed maximum price basis.

3.7.11 CMR Supplied Equipment or Supplies. With the prior approval of the Board and in its sole discretion, CMR may supply for use by its Trade Contractors or Trade Suppliers or for use by CMR for the performance of Work performed by CMR with its own forces, equipment and supplies necessary to the performance of the Work in addition to those items that the CMR is authorized to supply. However, the Actual Cost of such equipment or supplies reimbursable by the Board to CMR shall not in any event exceed the least of (i) the amount that would be paid by CMR for the procurement of such equipment or supplies under a competitive proposal procurement, or (ii) the amount that would be reimbursable to CMR as an Actual Cost for such equipment or supplies had such equipment or supplies been procured from others under the terms of the Contract Documents, or (iii) the applicable amounts referenced in Section 4.4.3.8.

3.7.12 No Conflict of Interests. Without prior written approval from the Board after full disclosure by CMR, the CMR shall not award any Trade Contract to any Affiliate of CMR.

3.7.13 Fair Opportunity for Trade Contractors – Trade Packages. All construction Work to be performed by Trade Contractors shall be performed pursuant to Trade Packages from qualified Trade Contractors. The CMR shall make reasonable efforts to insure that Trade Contractors and Suppliers local to the Project site are given the fair opportunity to propose for, be considered for, and participate in the award of Trade Packages required for completion of the Project. The CMR shall, on behalf of Board, advertise and solicit proposals from Trade Contractors and from suppliers of material or equipment fabricated to a special design for the work. All proposals will be delivered to the CMR. CMR will, on behalf of the Board, analyze all such proposals to determine whether the proposals are responsive and the proposers are responsible. The CMR will recommend to the Board, based on price and other factors, the Trade Contractor or Supplier. If the recommended Trade Contractor or Supplier is not the low price proposer, CMR will provide additional information justifying its recommendation. The Trade Package will be awarded upon receipt of approval from the Board. If the Board does not agree with the CMR's recommendation, the Board will instruct the CMR to award the Trade Package to the lowest responsive and responsible price proposer, or to reissue the package for additional proposers.

3.7.14 Warranty of CMR. The CMR warrants that the Trade Contractors selected by him are reputable, skilled, reliable, competent, qualified in the trade or field in which they are to perform on the Project, and thoroughly familiar with applicable codes. The CMR will have primary responsibility for all Trade Packages. Trade Contractors are required to execute CMR's standard subcontract, as amended to be consistent with this Contract. The Trade Contractors shall be acting as Trade Contractors to the CMR. The CMR shall execute and administer all such Trade Package contracts and shall assume full responsibility for each and every item of Work performed thereunder and for the timely completion of all such Work in accordance herewith, including responsibility for all guarantees and warranties to be provided by each Trade Contractor.

3.7.15 CMR Responsible for Acts and Omissions of Trade Contractors, Materialmen, Suppliers, and Employees. The CMR agrees that he is as fully responsible for the acts and omissions of his Trade Contractors, materialmen, suppliers, and employees, and of persons either directly or indirectly employed by them, as he is responsible for the acts and omissions of persons directly employed by him. The failure of a Trade Contractor, materialman, supplier, or employee to perform shall not be asserted by the CMR as an excuse for any omission from or noncompliance with requirements of the contract; nor shall the CMR be entitled to an extension of time because of failure of a Trade Contractor, materialman, supplier, or employee to perform unless said failure was a direct result of some delay to the Trade Contractor, materialman, supplier, or employee of the kind and character described in the Contract for which the CMR shall have requested and received an extension of time under the terms of the General Requirements. The subcontracting of work does not relieve the CMR of the full responsibility for the execution of the work and for compliance with all requirements of the Contract Documents. The CMR shall not assert negligence, inefficiency, insolvency, bankruptcy, or incompetence of any Trade Contractor, materialman, supplier, or employee as excuse for the existence of any noncompliance with or omission to fulfill any obligation under the Contract either as to timely performance or as to compliance with methods and materials designated in the Contract Documents; nor shall the CMR assert nonperformance (unless an extension of time shall have been granted pursuant to the Contract requirements) of a Trade Contractor, materialman, supplier, or employee as excuse for the existence of any noncompliance with or omission to fulfill any obligation under the Contract either as to timely performance or as to compliance with methods and materials designated in the Contract Documents. Any provision in any contract between the CMR and any Trade Contractor

pursuant to which the CMR is obliged to present to the Board any claim of any Trade Contractor shall be invalid.

3.7.16 Relationship of CMR and Trade Contractors.

3.7.16.1 Obligations of Each. The CMR agrees to bind every Subcontractor, Trade CMR, Supplier (hereinafter collectively referred to as “Subordinate CMR”) to the terms of the Contract Documents insofar as they are applicable to its work, including the following provisions of this Section:

3.7.16.1.1 The CMR Agrees:

- (a) To be bound to the Subordinate CMR by all the obligations that the Board owes to the CMR under the Contract Documents.
- (b) To pay the Subordinate Contractor the amount allowed to the CMR on account of the Subordinate Contractor’s work to the extent of the Subordinate Contractor’s interest therein within seven days of receipt of payment from the Board.
- (c) To pay the Subordinate Contractor upon receipt of payment from Board such that the Subordinate Contractor’s total payments shall be as large in proportion to the value of the work done by the Subordinate Contractor as the total amount certified and paid to the CMR is to the value of the work done by the Subordinate Contractor.
- (d) To pay the Subordinate Contractor a just share of any property insurance money received by the CMR and due to Subordinate Contractor for work performed by Subordinate and paid for by insurance.
- (e) That no claim for services rendered or materials supplied or other matters by the CMR against the Subordinate Contractor shall be valid unless written notice thereof is given by the CMR to the Subordinate Contractor prior to or during the first ten days of the calendar month following that in which the CMR determines that the claim is chargeable against that Subordinate Contractor.
- (f) To give the Subordinate Contractor, upon its request, an opportunity to be present with CMR and to submit evidence in any dispute involving rights of the Subordinate Contractor.

3.7.16.1.2 The CMR Agrees to require its Subcontractors to do the following:

- (a) To be bound to the CMR by the terms of the Contract Documents and to assume toward the CMR all the obligations and responsibilities that the CMR by the aforesaid documents assumes toward the Board.
- (b) To submit to the CMR applications for payment in such reasonable time as to enable the CMR to apply for payment under these General Conditions.
- (c) To make all claims for extras, for extensions of time or for damages to the CMR in the manner provided in the General Conditions for like claims by the CMR upon the Board, except that the time for making such claims to the CMR is within ten days after the initial event leading to the claim.
- (d) To pay their Subordinate Contractors upon the payment of certificates issued under the schedule of values described in the General Conditions the amount allowed on account of such Subordinate Contractor’s work to the extent of such Subordinate Contractor’s interest therein within seven days of its receipt of payment.

- (e) To pay their Subordinate Contractors upon Subcontractor's receipt of payment such that at all times their Subordinate Contractors' aggregate payments shall be in proportion to the Work performed by each of the Subordinate Contractors.
- (f) To provide CMR with O.C.G.A. § 13-10-91 affidavits certifying registration and participation in the federal work authorization program as required by O.C.G.A. § 13-10-91 (b) (3).
- (g) To require their sub-subcontractors to provide them and Contractor with O.C.G.A. § 13-10-91 affidavits certifying registration and participation in the federal work authorization program as required by O.C.G.A. § 13-10-91 (b) (4).

3.7.16.2 Board Not Obligated to Any Subcontractor, Subordinate CMR, Trade CMR, or Supplier. There is no obligation on the part of the Board to pay to or to see to the payment of any sums to any Subcontractor, Subordinate CMR, Trade CMR, Supplier, laborer, employee, or person supplying labor, materials, machinery or equipment to the Project.

3.7.16.3 Term "Substantial Completion" Deleted. The term 'substantial completion,' if found, is hereby deleted and is of no force in all Subcontracts, Trade Contracts, and in the Trade Sections of the Contract Documents. In certain contexts, the term may be superseded by the term "Material Completion" as defined in this Contract.

3.7.16.4 Failure to Incorporate Terms in Subcontracts. The CMR agrees that failure on his part to incorporate this Section 3.5.5 in all Subcontracts, Trade Contracts, or Supplier contracts, is a material breach of an essential covenant of this Contract, and further agrees that in the event of such breach the CMR shall, within five days after demand of the Board, furnish proof in writing that the deficiency has been remedied to the end that (i) the CMR may not maintain that it is beyond his competence to require performance of terms of the contract by a subcontractor and (ii) no subcontractor may maintain that he has not assumed toward the CMR all the obligations and responsibilities that the CMR has assumed toward the Board. Failure on the part of the CMR to effect remedy as above within five days after receipt of written demand of the Board shall be grounds for issuance of a declaration of default by the Board.

3.7.17 Assignment of Trade Contracts, Subcontracts.

3.7.17.1 No Contractual Relationship. Nothing contained in this Contract creates a contractual relationship between the Board and any person or entity other than the CMR. However, the Board and CMR agree that the Board is an intended and express third-party beneficiary of all contracts for construction services and all subcontracts, purchase orders, and other agreements between the CMR and third parties in connection with the Project or the Work.

3.7.17.2 Conditional Assignment. The CMR hereby conditionally assigns to the Board all of its interest in any subcontracts (including, without limitation, purchase orders) entered into by the CMR for performance of any part of the Work. Such conditional assignment shall become effective only upon the termination of this Contract, whereupon the Board shall succeed to the rights and obligations of the CMR under such subcontract. The CMR shall incorporate, into its respective subcontracts, supply agreements, purchase orders, and other agreements in connection with the Project or the Work, language that expressly names the Board as an intended third-party beneficiary of such agreements.

3.7.17.3 Assignment Provisions. CMR shall also ensure that its subcontracts, supply agreements, purchase orders, and other agreements contain a provision that assigns to the Board the CMR's interest in the respective agreement to the Board immediately upon Trade Contractor's or supplier's receipt of Board's notice to such effect. Furthermore, CMR shall ensure that its subcontracts,

supply agreements, purchase orders, and other agreements contain a provision that allows the Board to terminate that agreement solely for the Board's convenience in accordance with the provisions set forth in this Contract. Board further agrees to pay reasonable costs of cancellation charges, or re-stocking costs for the Board's termination for convenience of subcontracts, supply agreements, purchase orders, and other agreements.

3.7.17.4 Assignment of Warranties. Without limiting CMR's post-construction obligations pursuant to this Contract, CMR shall assign to Board all post-construction warranties resulting from CMR's agreements with third parties, subject to CMR's reservation of rights under such warranties to the extent necessary to enable CMR to fulfill its obligations to Board hereunder. Moreover, CMR shall protect Board's interest in all such warranties and shall take no action nor commit an act or omission that renders such warranties void or voidable.

3.7.17 **Trade Contractor/Supplier Procurement Schedule.** The CMR shall maintain a schedule of proposed and awarded bid packages for Trade Contractors and Suppliers and shall submit a current copy to the Owner and Design Professional. The schedule shall be on a format acceptable to the Board and shall include the following headings and data:

- (a) Description
- (b) Bid Date
- (c) Award Date
- (d) Name of Trade Contractor or Supplier
- (e) Contract Execution Date
- (f) Award Amount
- (g) CMR Estimate
- (h) Variance

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SECTION 4 – COMPENSATION

PART 1 – GENERAL.

4.1.1 Authorized Compensation and Limitations.

4.1.1.1 CMR's Fee. CMR's Fee shall be the amount specified in Paragraph 5 of the Contract.

4.1.1.1.1 Basis of Fee. The CMR's fee is the amount, established by and agreed to by both parties, that is the full amount of compensation due to the CMR as gross profit, and for any and all expenses of the Project not included and identified as a Cost of the Work or the CMR's Overhead Cost, provided that the CMR performs all the requirements of the Contract Documents within the time limits established. The CMR's Fee consists of the following:

- a. Preconstruction Fee. For the preconstruction consulting services provided by CMR, including design consultation services, as described in Section 2 of the General Requirements, Board shall pay to CMR a Preconstruction Fee representing the gross profit relative to the preconstruction services, in accordance with Section 4, Part 2 below.
- b. Construction Fee. For the construction services, as described in Section 3 of the General Requirements, provided by CMR, Board shall pay to CMR a Construction Fee representing the gross profit relative to the construction services, in accordance with Section 4, Part 3 below.

4.1.1.1.2 Adjustments in the CMR's Fees. The CMR's Fee can only be changed by a written Change Order executed by both parties. The Fee can only be adjusted for material changes in the scope of the Work, which includes without limitation the management of the replacement of an insured or uninsured loss.

4.1.1.2 CMR's Preconstruction Costs and Construction Overhead Costs. The maximum allowable amount for preconstruction costs and construction overhead costs shall be not in excess of the amount specified in Paragraph 6 of Page 6 of the Contract. These costs and limitations consist of the following:

4.1.1.2.1 Preconstruction Costs and Expenses. The Preconstruction Costs and Expenses are inclusive of all costs for professional consulting services and all direct and incidental expenses not related to construction activities or the Work, including but not limited to cost estimating services, scheduling services, value engineering, constructability, toll telephone calls, facsimile charges, postage and use of courier services, photocopying and reproduction expenses, bond premiums, reproduction, salaries, wages, fees to consultants and subcontractors assisting the CMR, design coordination expenses and related services, based upon Actual Cost not exceeding, in the aggregate, the amounts shown in Paragraph 6 of Page 6 of the Contract.

4.1.1.2.2 Construction Overhead Costs. The Construction Overhead Costs are inclusive of all direct and incidental expenses including but not limited to toll telephone calls, facsimile charges, postage and use of courier services, photocopying and reproduction expenses, travel costs, sustenance, reproduction, salaries, wages, and field office expenses, based upon Actual Cost not exceeding, in the aggregate, the amounts for construction overhead items shown in Paragraph 6 of the Contract.

4.1.1.3 Cost of the Work. The Actual Cost for the Cost of the Work shall be paid as set forth in Section 4, Part 4.

4.1.1.4 Stated Cost Limitation (GMP Cost Limitation). The Guaranteed Maximum Price shall not be in excess of the Stated Cost Limitation.

4.1.1.4.1 Stated Cost Limitation (GMP Cost Limitation). The amount allocated for the construction services and construction of the Project. GMP Cost Limitation does not include design costs, Board contingency, or Site acquisition costs. See Subparagraph 4.1.1.4.2 for details and effect of the GMP Cost Limitation.

4.1.1.4.2 Details and Effect of the Stated Cost Limitation (GMP Cost Limitation).

- (a) The CMR recognizes that the Design Professional is required to design the Project such that the initial Guaranteed Maximum Price will not exceed the Stated Cost Limitation.
- (b) In contracting with a public or governmental body to render services, the CMR is charged with knowledge of any limitation imposed on such body as to amount of money it may spend for a given project; and
- (c) The Stated Cost Limitation limits the Board, the Design Professional and the CMR prior to, but not after, the establishment of the GMP.

4.1.1.5 Guaranteed Maximum Price. The Board will pay the CMR an amount established as the CMR's Fee, plus the actual Construction Overhead Costs and the actual Cost of the Work as described herein, but not to exceed, in any event or for any reason, the Guaranteed Maximum Price.

4.1.1.6 Effect of GMP Change Order. The Preconstruction Phase cannot extend beyond the execution of the GMP Change Order. By definition, all services provided after the execution of the GMP Change Order are Construction Phase Services and are included in the GMP. When CMR Proposes a GMP Change Order, any earned but unbilled balance of the Preconstruction Fee shall be invoiced for payment. Upon acceptance of the GMP Change Order by Board, the GMP Change Order shall exclusively govern the compensation to CMR for all fees and services thereafter provided by CMR and all services previously provided for which payment has not been made or application for payment made or invoice submitted.

4.1.1.7 Payment Schedule. The CMR's Fee shall be paid as described in Section 4.

4.1.1.8 Payments Withheld. The Board may withhold from the Cost of the Work or, on account of subsequently discovered evidence, nullify the whole or a part of any pay request or certificate to such extent as may be necessary to protect the Board from loss on account of:

- (a) Defective work not remedied.
- (b) Claims filed or reasonable evidence indicating probable filing of claims.
- (c) Failure of the Contractor to make payments properly to subcontractor or for materials or labor.
- (d) A reasonable doubt that the contract can be completed for the balance then unpaid.
- (e) Damage to another contractor or to some third party.
- (f) Failure to maintain a rate of progress in accordance with the construction progress schedule.
- (g) Failure to supply enough skilled workmen or proper materials.

When the above grounds are removed, payment shall be made for amounts withheld because of them. With regard to cases (b) and (c) above, the Board may agree to payment upon receipt of a satisfactory Bond to Discharge Claim in the amount of double the claim (see Section 7, Contract Forms). At the option of the Board, adherence to the construction progress schedule shall be a condition precedent to the right of the CMR to demand payment. No omission on the part of the Board to exercise the aforesaid option shall be construed to be a waiver of breach of the construction progress schedule or acquiescence therein, and the Board may exercise its option from time to time and as often as may be expedient.

4.1.1.9 Change in Tax Rates. If the rate of sales, use, payroll, or other similar direct taxes on materials, equipment, or labor required for the performance of the Work shall increase above the

rate in force on the date of the GMP Change Order, then the Cost of Work Component (but not the Fee or Construction Overhead Component) of the GMP Change Order shall be increased by the amount of additional taxes incurred by CMR as a result of such change in rate. A written claim shall be made promptly after CMR receives notice of such tax increase. If the tax rates decrease, the estimated amount of saved taxes due to the decrease as yet unexpended shall be moved into the Construction Contingency.

4.1.2 Audit. At the request of the Board, the CMR shall allow the Board the opportunity to select an auditor to examine and inspect the Project and the CMR's books, records, and any and all accounts and similar data related to the Project. The Board shall bear the cost of such audit. The auditor may sign a confidentiality agreement before conducting any such audit. Notwithstanding such agreement, CMR understands and agrees that all project records are subject to the Georgia Open Records Act. Approval of an Application for Payment by the Board, including Final Payment, shall not foreclose the right of the Board to examine the books and records and their backup documents in accordance with the Contract Documents to determine the correctness and accuracy of any item.

4.1.3 Limitation of Board Liability. The Board shall not be liable to pay CMR any amount for Fees, Overhead, or Actual Cost of Work performed after the date of the GMP Change Order that, after the payment of such amount or any portion thereof, would cause the aggregate amount paid to CMR hereunder to exceed the Guaranteed Maximum Price.

4.1.4 Provision for Further Development of the Contract Documents. Because the Contract Documents may not be finished at the time the Guaranteed Maximum Price proposal is prepared, the CMR shall provide within the Guaranteed Maximum Price and its Construction Contingency an amount for further development of the Contract Documents.

4.1.5 Inclusion of Contingency Amounts in GMP.

4.1.5.1 A Part of the Cost of the Work. The estimated Cost of the Work shall include in the Construction Contingency sums established by the CMR for the CMR's use to cover costs arising under Section 4.4.5 et seq.

4.1.5.2 CMR to Monitor. The Board and the CMR agree that the amounts so established will be monitored by both parties and used by the CMR, with approvals as specified by the Board, to provide for the cost of labor, materials, services, or equipment that are properly reimbursable as a Cost of the Work but that will not be the basis of a Change Order to adjust the GMP. The balances of all contingency funds will be returned to the Board at the completion of the project. The CMR will provide a full accounting of the status of the contingency funds to the Board on a quarterly basis until the Project is completed, notwithstanding any change to a Lump Sum Price as permitted by Section 3, Part 3.

4.1.6 CMR's Compensation Prior to Acceptance of GMP. Prior to the Board's acceptance of CMR's Guaranteed Maximum Price proposal and issuance of a Proceed Order, CMR's compensation shall be limited to an amount equal to the sum of (i) all direct personnel expenses plus (ii) reimbursement of all reasonable out-of-pocket costs and expenses incurred in the performance hereunder with respect to such and the Cost of the Work set forth in any approved Construction Order. Prior to the Board's acceptance of the CMR's Guaranteed Maximum Price proposal and issuance of a Proceed Order, the CMR shall not incur any cost to be reimbursed as part of the Cost of the Work, except as the Board may specifically authorize in writing or in an approved Construction Order.

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PART 2 – PAYMENT FOR PRECONSTRUCTION PHASE SERVICES.

4.2.1 Basis of Compensation. For its services, the CMR will be reimbursed for its actual wages, salaries and costs as permitted in Section 4, Part 4, not to exceed the prevailing wage rate or the reasonable salaries set forth in Exhibit E and Staffing Plan, Wage and Salary Schedule (Section 7, Forms).

4.2.2 Payment Schedule. The Preconstruction Fee payable under Section 4.1.1 shall be paid monthly. CMR shall submit by the twenty-fifth day (25th) of each month an invoice for the actual costs of the Preconstruction costs and Expenses it has incurred, plus the applicable Preconstruction Fee. If the Preconstruction Fee is a lump sum fee, the CMR shall calculate the Fee as a proportion of the services actually performed. If the Preconstruction Fee is a percentage, the percentage shall be calculated as a percentage of the actual costs of the Preconstruction Costs and Expenses incurred.

4.2.3 Payment Due. If approved by the Board and to the extent approved by the Board, the amount of such invoice shall be paid promptly by the Board. Amounts unpaid more than 30 days may bear interest as provided in Section 4.3.17.

4.2.4 CMR's Fee. If the Preconstruction Phase Services are being rendered simultaneously with Construction Phase Services, each monthly invoice shall include a pro rata portion of the CMR's fee based on the preliminary progress schedule and the actual costs of the Construction Overhead Costs actually incurred. As the schedule is adjusted, each subsequent invoice will be adjusted to provide for the allocation of the Fee throughout the life of the Project.

4.2.5 Effect of GMP Change Order. The Preconstruction Phase cannot extend beyond the execution of the GMP Change Order. By definition, all services provided after the execution of the GMP Change Order are Construction Phase Services and are included in the GMP.

4.2.6 Form of Applications for Payment. Applications for payment shall meet the requirements of Section 4.3.10, and shall be on the Application for Payment form set forth in Exhibit I.

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PART 3 – PAYMENT FOR CONSTRUCTION PHASE SERVICES

4.3.1 Basis of Compensation.

4.3.1.1 Actual Costs. For its services the CMR will be reimbursed for its actual wages, salaries and costs as permitted in Section 4, Part 4, not to exceed the prevailing wage rate or reasonable salaries set forth in Staffing Plan, Wage and Salary Schedule (Exhibit K).

4.3.1.2 Schedule of Values as a Comparison. Before the first Application for Payment, the CMR shall submit to the Board through the Design Professional a Schedule of Values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Board may require. This Schedule of Values, unless objected to by the Board, will be used as a basis for reviewing the CMR's Applications for Payment. Each Application for Payment will be reviewed for actual costs and also for consistency based on percentage completion of the Schedule of Values. The Schedule of Values will also be utilized in the event the Board elects conversion to a Lump Sum Price pursuant to Section 3.3.6.

4.3.2 Submission of Applications for Payment. By the twenty-fifth (25th) day of each month, the CMR shall submit to the Board itemized Applications for Payment in the form found in Section 7. The CMR shall submit no more than one (1) Application for Payment during each month.

4.3.3 Timing of Payments. Thirty days from Board's receipt of approved Application for Payment, as subject to the terms and conditions of this agreement.

4.3.4 Payments Withheld. The Board may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any application for payment or certificate to such extent as may be necessary to protect the Board from loss on account of:

- (a) Defective work not remedied
- (b) Claims filed or reasonable evidence indicating probable filing of claims.
- (c) Failure of the Contractor to make payments properly to subcontractor or for materials or labor.
- (d) A reasonable doubt that the contract can be completed for the balance then unpaid.
- (e) Damage to another contractor or to some third party.
- (f) Failure to maintain a rate of progress in accordance with the construction progress schedule.
- (g) Failure to supply enough skilled workmen or proper materials.

When the above grounds are removed, payment shall be made for amounts withheld because of them. With regard to cases (b) and (c) above, the Board may agree to payment upon receipt of a satisfactory Bond to Discharge Claim in the amount of double the claim (Exhibit O). At the option of the Board adherence to the construction progress schedule shall be a condition precedent to the right of the CMR to demand payment of an application for payment or certificate. No omission on the part of the Board to exercise the aforesaid option shall be construed to be a waiver of breach of the construction progress schedule or acquiescence therein, and the Board may exercise its option from time to time and as often as may be expedient.

4.3.5 Retainage.

4.3.5.1 Withholding of Retainage; Conversion to Lump Sum. Retainage shall be withheld from each Application for Payment to the CMR in the amount of ten percent of the sum of the total cost for original Contract Work, Change Order Work, materials stored on the Site and CMR Fee earned. After one-half of the Contract Sum, including Change Orders, becomes due and the Work meets all of the following conditions:

- (a) On or ahead of the Overall Project Schedule; and
- (b) There are no unresolved breaches of Notices of Non-Compliant Work; and
- (c) There is no delinquency in the completion of work and filing of the final breakdown and accounting pursuant to any Change Orders utilizing a Force Account; then, if the CMR requests and the Design Professional approves in writing, the sum being withheld as retainage will be converted to a lump sum and held by the Board until Material Completion.

4.3.5.2 Reinstatement of Retainage. The Board will withhold no further retainage from payments to the CMR unless one or more of the following events occur:

- (a) The percentage of work complete falls behind the percentage required by the Overall Project Schedule by as much as five percent; or
- (b) The CMR breaches a Notice of Non-Compliant Work; or
- (c) The CMR becomes delinquent in regard to the filing of the final breakdown and accounting pursuant to any Change Orders utilizing a Force Account;

in which event or events the Board shall reinstate the ten percent retainage on all Applications for Payment due to be paid while one or more of the events continues to exist. The CMR will be given written notice of the reinstatement of the retainage.

4.3.5.3 Re-conversion to Lump Sum. If the CMR subsequently:

- (a) Recovers all lost time and puts the work back on schedule; and
- (b) Remedies all breaches of Notices of Non-Compliant Work; and
- (c) Supplies a proper breakdown and accounting pursuant to any Change Orders utilizing a Force Account;

then the sums withheld while either or all of the events existed may in the discretion of the Board be again converted to a lump sum.

4.3.6 Subcontractor's Retainage Release. Upon request by the CMR, Board may, but is not required, to permit an amount equal to the subcontract retainage of a Subcontractor to be separately released from the retainage held by the Board as he completes his work. An application in accordance with the Board's specimen form (See Section 7, Forms) for release of a Subcontractor's retainage shall contain a release of all claims by the Subcontractor and shall bear the original certificates of the Subcontractor, the CMR, and the Design Professional that the Subcontractor's work has been fully performed and that the sum for which payment is requested is due by the CMR to the Subcontractor. Before receiving any portion of the retainage the CMR will be required to furnish a non-influence affidavit and a statutory affidavit executed by the Subcontractor in the exact form as shown in Section 7. Checks releasing a Subcontractor's retainage shall be made payable to the CMR, the CMR's surety, and the Subcontractor and shall be mailed to the CMR's surety. This article does not create any contractual relationship between the Board and the Subcontractor or any duty of the Board to any Subcontractor.

4.3.7 Supplier's Retainage Release. Upon request by the CMR, Board may, but is not required, to permit an amount equal to the retainage of Supplier to be separately released from the retainage held by the Board, if the Supplier has fully performed all delivery obligations under its Trade Contract or, in the alternative, to permit CMR to take advantage of discounts or for other reasons in the best interest of the Board. The retainage release shall be processed in the same manner as for a Subcontractor as set forth in Section 4.3.6 above.

4.3.8 CMR's Warranty on Applications for Payment. The CMR hereby warrants to the Board that, subject to Board making payments to the CMR in accordance with the Contract Documents:

4.3.8.1 Title to Work. Title to Work, materials and equipment covered by an approved Application for Payment will pass to the Board either by incorporation in construction or upon receipt of payment by the CMR, whichever shall occur first;

4.3.8.2 No Liens. Work, materials and equipment covered by any previously approved Applications for Payment are free and clear of liens, claims, security interests or encumbrances, hereinafter referred to as "liens";

4.3.8.3 No Encumbrance. No Work, materials or equipment covered by an approved Application for Payment will have been acquired by the CMR, or any other person performing work at the Site or furnishing materials or equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the CMR or such other person.

4.3.9 Special Provisions for Payment of CMR Fee under a Component or GMP Change Order.

4.3.9.1 Payment of CMR Fee.

4.3.9.1.1 Prior to GMP. With respect to Construction Orders prior to the GMP Change Order, the CMR's Fee shall be paid on a monthly basis proportionately to the ratio which the Actual Costs for the Work performed under any Construction Order bears to the Trade Contract sum stated in the applicable Construction Order less retainage.

4.3.9.1.2 After GMP. After a GMP Change Order, CMR's Fee shall be paid on a monthly basis and proportionate to the ratio the Actual Costs incurred for Work on the Project bear to the Estimated Cost Component of the GMP Change Order, less retainage.

4.3.9.2 Payment of CMR Fee Withheld. The Board may withhold payment only on account of a breach of this Contract by CMR, its failure to perform the management and similar services hereunder, its failure to provide information it is required to provide to the Board hereunder, or under other circumstances as may be permitted by the Contract or the CMR's Proposal.

4.3.10 Applications for Payment.

4.3.10.1 Form of Application. The CMR shall periodically submit to the Design Professional an Application for Payment on the form set forth in Exhibit I, for each payment requested, and, if requested by the Board or Design Professional, shall attach backup materials including, but not limited to, receipts or other vouchers, showing his payments for materials and labor, including payments previously made to Subcontractors.

4.3.10.2 Initial Breakdown and Periodical Payments. Each Application for Payment shall be submitted at least ten (10) days before each payment falls due, and the CMR shall, before the first application, shall submit to the Design Professional a Schedule of Values as required by Section 4.3.1.2 above of the various parts of the work, including quantities, aggregating the total sum of the Contract, divided in the same manner set forth in the Application for Payment Form set forth in Exhibit I and so arranged and so itemized as to meet the approval of the Design Professional and, further, if requested, supported by such evidence as to its correctness as the Design Professional may direct.

4.3.10.3 Materials Stored. If the Application for Payment includes materials delivered and suitably stored at the Site but not incorporated in the work, it shall, if required by the Board or the Design Professional, be conditional upon submission by the CMR of bills of sale or such other procedure as will establish the Board's title to such material or otherwise adequately protect the Board's interest. The CMR is responsible for the existence, protection, and, if necessary, replacement of materials until execution of the Certificate of Material Completion by the Design Professional. The Board will agree to pay reasonable expenses for storing materials offsite upon approval by the Board and with documentation that materials stored off-site will be insured.

4.3.10.4 Action by Board. The Board may refuse to pay any item or items contained in any such Application for Payment until and unless documentation and details are submitted to the reasonable satisfaction of the Board. While awaiting such documentation, the Board may delete any item or items at issue, and elect to pay the items which are approved, indicating the revised total amount paid upon the invoice. The deleted items may be paid by an interim application for payment, or separately identified and included on a subsequent regular application for payment.

4.3.10.5 Accounting Format. Applications for Payment shall be broken down by CSI Category and, in certain situations, by CSI Description and capital asset category, as set forth in the form for Application for Payment. The purpose is to provide appropriate backup documents for the CMR's Final Certification of Costs in conformance with GASB 34 accounting standards. See Exhibit I and Exhibit J, "Application for Payment" and Final Certification of Costs.

4.3.10.6 Local and/or MWBE Monthly Payment Report. With each invoice request submitted by CMR as a condition precedent to payment, CMR shall also submit on the form attached as Exhibit R, a monthly written report to the Board concerning the status of all payments owed and paid by CMR to its various local and/or MWBE subconsultants.

4.3.11 Processing of Application for Payment. The Design Professional will review the Application for Payment prepared and executed by the Contractor and, if he concurs, execute a certificate on the face of the Application for Payment as to its accuracy. The Design Professional shall visit the Site after the Contractor has submitted the Application for Payment and conduct such inspections and reviews as are necessary to make a decision as to the accuracy of the Application for Payment. If the Design Professional and the Contractor cannot agree on the appropriateness of the Application for Payment in question, the Design Professional shall make a decision. Upon determining the appropriateness of the Application, the Design Professional shall execute the certificate on the Application for Payment and forward it to the Board for payment. Not later than seven days after receipt of the Application for Payment, the Design Professional shall issue its certificate for such amount as it decides to be properly due or state in writing its reasons for withholding any sums in its certificate.

4.3.12 Representations of CMR. The Application for Payment constitutes a representation by the CMR to the Board that (i) the design and construction have progressed to the point indicated; (ii) the quality of the Work covered by the application is in accordance with the Contract Documents; and (iii) the CMR is entitled to payment in the amount requested.

4.3.13 Design Professional's Certificate Not Acceptance of Work. No certificate issued by the Design Professional, or partial or entire use or occupancy of the Work by the Board shall be an acceptance of any work or materials not in accordance with the Contract Documents.

4.3.14 Payment Not Acceptance of Work. No payment nor any partial or entire use or occupancy of the Project by the Board shall constitute an acceptance of Work not in accordance with the Contract Documents.

4.3.15 Payment for Change Order Work. Payments will not be made for any changes in the Work until a Change Order has been executed.

4.3.16 Payment Due. If approved by the Board and to the extent approved by the Board, the amount of such invoice shall be paid promptly by the Board.

4.3.17 Late Payments and Interest. Should the Board fail to pay proper invoice within thirty calendar days of receipt, the CMR shall notify the Board in writing by certified or statutory mail. If the Board fails to pay within five business days of receipt of the notice, the CMR shall receive, in addition to the sum named in the proper invoice, interest thereon at the rate of one half percent per month on the unpaid balance as may be due. The Georgia Prompt Pay Act (O.C.G.A. 13-11-1 *et seq.*) shall not be applicable to payments between the Board and CMR.

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PART 4 – COST OF THE WORK

4.4.1 Definition. The term "Cost of the Work" is defined in Section 1.1.9.22, and includes costs necessarily incurred by CMR in the proper performance of the Work. Such costs shall include or be limited by the items set forth in this Part and otherwise in this Contract.

4.4.2 Preconstruction Phase Services.

4.4.2.1 Labor Costs. When approved in advance by the Board (See Exhibit K – Staffing Plan, Wage and Salary Schedule), reasonable salaries and wages of workers directly employed by CMR to perform work directly associated with the Project performed off-site including Preconstruction personnel and Administrative assistance. All pre-construction salaried workers employed by CMR shall be reimbursed based upon Actual Cost not exceeding in the aggregate the amounts shown in the CMR's proposal, shown as Exhibit C, which, upon agreement with the Board, is incorporated into and made a part of this contract by reference, or the total of the amounts shown in the aggregate of Paragraph 6 (a) of the Contract.

4.4.2.2 Pre-Construction Costs and Expenses. CMR shall be reimbursed for all reasonable Pre-Construction costs and expenses incurred in the performance of CMR's Pre-Construction services under this Contract, including, without limitation, (i) toll telephone calls, facsimile charges, postage and use of courier services; (ii) photocopying and reproduction expenses; and (iii) travel costs, based upon Actual Cost not exceeding the maximum amounts in the shown on Exhibit C, or the total of the amounts in the aggregate of Paragraph 6 (a) of the Contract.

4.4.3 Construction Phase Services. "Actual Cost" as used in this Contract shall consist of all costs, except those costs excluded by Section 4.4.4, necessarily incurred by the CMR in the proper performance of the Work or services described in the Contract Documents (including this Contract) for which records required by the Contract Documents are established contemporaneously with the incurring of such cost, and maintained and which are not otherwise reimbursed or recovered by CMR. Such Actual Costs shall be at rates not higher than the standard paid in the locality of the performance required by the Contract Documents except upon the prior written consent of the Board. The Board will pay the CMR for the following Actual Costs incurred during the Construction Phase of the Project, consistent with the approved GMP

4.4.3.1 Wages.

4.4.3.1.2 Actual Wages. Actual wages paid for labor under applicable collective bargaining agreements, or under a wage schedule, not to exceed the prevailing wage rate in the area, agreed upon by the Board and CMR and including such Board -approved welfare or other benefits, if any, as may be payable with respect thereto.

4.4.3.2.2 No Changes. No change in such wage schedules shall be made by CMR without prior approval by Board in advance. Employees of CMR who are engaged at shops or on the road in expediting the production or transportation of materials or equipment in connection with the performance of the Work shall be considered stationed at the Field Office and their wages paid for that portion of their time spent on such performance. The Board shall be furnished with a list of employees whom the CMR assigns to the performance of Work or services under this Contract with an indication of the wages of each employee. The aforesaid employees shall be paid on the basis of time cards to which the Board shall have ready access.

4.4.3.2 Salaries.

4.4.3.2.1 Actual Salaries. When approved in advance by Board and accompanied by certified payroll records, the actual amount of reasonable salaries paid by CMR of CMR's employees when stationed at the Site Field Office for that portion of the time spent in performing the Work in whatever capacity employed, and CMR's employees in its main or

branch offices for that portion of their time spent in performing estimating, scheduling, procuring, accounting and administrative functions essential for the proper performance of the Work, including project management functions performed at CMR's main offices prior to the establishment of the Field Office, to the extent such costs are consistent with the staffing plan and wage and salary schedule approved by Board in advance.

4.4.3.2.2 No Changes. No change in such salary schedules shall be made by CMR without prior approval by Board in advance. Employees of CMR who are engaged at shops or on the road in expediting the production or transportation of materials or equipment in connection with the performance of the Work shall be considered stationed at the Field Office and their salaries paid for that portion of their time spent on such performance. The Board shall be furnished with a list of employees whom the CMR assigns to the performance of Work or services under this Contract with an indication of the salary of each employee. The aforesaid employees shall be paid on the basis of time cards to which the Board shall have ready access.

4.4.3.3 Employee Taxes. Cost of contributions, assessments or taxes for such items as unemployment compensation and social security, insofar as such cost is based on wages, salaries, or other remuneration paid to employees of the CMR and included in the Actual Cost under Paragraphs 4.4.3.1 and 4.4.3.2.

4.4.3.4 Cost of Materials and Other Items. The cost of all materials, supplies, equipment, temporary facilities and hand tools not owned by the workers that are used or consumed in the performance of the Work, less the salvage or residual value on such items used, but not consumed on the Work that remain the property of the CMR, including without limitation the costs of inspection and testing not furnished by the Board, storage and handling. Excluded from the cost of materials and other items that will be paid for by the Board are computer equipment, printers, furniture, or other equipment purchased by CMR which may be also be used on other projects.

4.4.3.5 Sales Taxes. Sales, use or similar taxes for which CMR is liable and imposed by any governmental authority due to or in connection with the performance of the Work or services required hereunder.

4.4.3.6 Trade Contractors. The cost of all work performed by Trade Contractors or Trade Suppliers for Work performed or materials procured pursuant to Trade Contracts entered into in accordance with this Contract and subject to the limitations stated in the Contract Documents.

4.4.3.7 Royalties. Royalties and license fees payable under any patents and the cost of defending any claim of infringement of any patent, and any liability under such claim, unless such claim arises out of CMR's failure to pay royalty and license fees.

4.4.3.8 Rental Charges. Rental charges of all necessary equipment used at the Site of the Project, exclusive of hand tools owned by workers or included in Section 4.4.3.4 above, whether rented from the CMR or others, including loading and unloading, installation, repairs and replacements, dismantling, removal, costs of lubrication, transportation, insurance and delivery costs thereof, at rental charges consistent with those prevailing in the area, during their use on the Work and wages of operating engineers for the operation of such equipment, subject to the limitations stated in Contract Documents and in Section 3.7.11. Rental charges for cars, trucks, or other vehicles used by CMR and its workers to travel to and from the Project and from the Project to other projects performed by the CMR or workers' personal errands will not be included in the Rental Charges that may be reimbursed by the Board.

4.4.3.9 Insurance Premiums. The costs of premiums for all bonds, the cost of insurance (including Workers' compensation insurance) covering risks related solely to the Project, and the *pro rata* cost of insurance (including Workers' compensation insurance) covering such Project risks and other risks, which bonds and insurance the CMR is required by the Contract Documents to purchase and maintain.

4.4.3.10 Permits, Fees, and Other Items. Permits, fees, licenses, tests, royalties, sales, use, or any other such taxes, tariffs or duties related to the Work for which the CMR is responsible, but not including any fines or interest due to CMR's failure to meet legal requirements associated with such items. Fees and assessments for the building permit and impact fees (as included in approved Guaranteed Maximum Price Proposal) and for other permits, licenses and inspections for which CMR is required by the Contract Documents to pay.

4.4.3.11 Field Office Costs. All costs associated with establishing, equipping, operating, maintaining and demobilizing the field office, but excluding the cost of equipment that CMR has used on other projects or could use on future projects, including computer equipment, printers, office furniture, and other equipment that CMR may use for other projects.

4.4.3.12 Utility Costs. The cost of utilities, such as water, power, fuel, sewer, and other utilities, (unless provided by Board) required for CMR's operations at the Project Site and fuel consumed in the generation of electrical power or in the operation of equipment required in the CMR's operation at the Project Site, except to the extent such costs are included in the rental rates for such equipment in accordance with this Contract.

4.4.3.13 Demolition Costs. Cost of demolition, if any, and removal of non-hazardous materials, debris and waste materials;

4.4.3.14 Testing. Fees of testing laboratories for tests required by the Contract Documents not paid for by the Board up to \$300/month.

4.4.3.15 Reproduction Costs. Costs of reproduction of plans, specifications, and other documents required for the construction of the Project. Reproduction costs determined to be CMR's reproduction costs unrelated to the Project will be not be paid.

4.4.3.16 Telephones and Other Items. The cost of telephone service (including toll charges), office equipment, and office furnishings, and similar items incurred in the operation of the Project Field Office, excluding telephone service associated with CMR's home office or other Project Offices, the cell phones of CMR's workers that may be used for personal use/other projects, office equipment and office furnishings already owned by CMR or purchased for CMR for this project that may be reused by CMR on future projects.

4.4.3.17 Safety Plan. Cost incurred in the implementation of Project Site safety and security plans.

4.4.3.18 Deposits. Deposits lost for causes other than the CMR's negligence.

4.4.3.19 Transportation. The cost of transportation, meals, and lodging incurred in travel by CMR's employees, if approved in advance by the Board, but only if such travel is to a point outside Chatham County and then in accordance with policies of the State Auditor of the State governing travel by employees of the State

4.4.3.20 Final Clean-up. Costs of final clean-up of the Project.

4.4.3.21 Emergency Costs. Any and all costs incurred due to an emergency affecting the safety of persons or property and related to the performance of the Work.

4.4.3.22 Other. Other costs approved in advance by the Board .

4.4.4 Limitations on the Cost of the Work. All costs not identified in Sections 4.4.2 and 4.4.3 shall be considered a part of the CMR's Fee. Without limiting the effect of the foregoing, the following items are specifically excluded from the Cost of the Work:

4.4.4.1 RESERVED.

4.4.4.2 Salaries. Wages and salaries paid by CMR for officers, directors, and partners of CMR, whether or not stationed at the site Field Office, or for officers, directors, partners or employees of CMR performing Basic Services in the main or branch offices in any capacity whatsoever except as provided in Section 4.4.3.2. Salaries and other compensation of CMR's personnel stationed at CMR's principal office or offices other than the site unless agreed to by Board or as noted in Section 4.4.3.2 above.

4.4.4.3 Employment Taxes. Costs of contributions, assessments, or taxes for such items as unemployment compensation and social security paid by CMR, insofar as such costs are based on wages, salaries, or other remuneration paid to officers, directors, partners, or employees of the CMR under Section 4.4.4.2.

4.4.4.4 Office Expenses. CMR's main office costs and offices other than the site office except as provided in Section 4.4.3.11.

4.4.4.5 Overhead Expenses. Overhead and general expenses, except as may be expressly included in Sections 4.4.2 and 4.4.3, above.

4.4.4.6 Capital Expenses. CMR's capital expenses, including interest on capital employed either in CMR's plant or for expenditures incurred in connection with the Work.

4.4.4.7 Transportation. Costs of transportation, traveling, and temporary accommodation expenses of employees, officers, or other staff of CMR, except as provided in Section 4.4.3.19.

4.4.4.8 Relocation Expenses. Relocation costs for any employees, officers, or other staff of CMR, except as provided in Section 4.4.3.19.

4.4.4.9 Profit Sharing. Profit sharing, bonuses, or other similar compensation of any kind paid by CMR to its employees.

4.4.4.10 Fines, Penalties and Other Items. The cost of all fines and penalties, including interest thereon, assessed against CMR by any federal, state or local government or quasi governmental authorities.

4.4.4.11 Lost or Stolen Equipment. The cost of replacing lost or stolen equipment of any kind, tools, including hand and small tools, or materials of any kind.

4.4.4.12 Undocumented Costs. Costs for which records required by this Contract are not established or maintained.

4.4.4.13 Negligent Costs. Costs which arise as a result of the default, breach, delinquency, oversight, negligence, or lack of due care by CMR or any of its employees, servants, consultants, officers, Trade Contractors, Trade Suppliers or any other person or party which performs services for the CMR in connection with the Work, except as provided in Section 4.4.5.

4.4.4.14 Legal Fees. Legal fees.

4.4.4.15 Contingency Costs. Any contingency cost not covered by Section 4.4.5.

4.4.4.16 Other Costs. Any cost not specifically and expressly described in Sections 4.4.2 and 4.4.3 above.

4.4.4.17 Costs in Excess of GMP. Costs which would cause the Guaranteed Maximum Price, if any, to be exceeded.

4.4.5 Construction Contingency Costs. As provided in this Section, but only prior to the Design Professional's Certificate of Material Completion, the CMR shall be entitled to payment as a Construction Contingency Cost item, but not in the aggregate in excess of the Construction Contingency Component of its Construction Order or of the GMP Change Order, as the case may be, as adjusted pursuant to Sections 4.4.6 and 4.4.7, all reasonable costs actually incurred prior to such Certificate of Material Completion incident to the performance of Work under this Contract, which are not otherwise reimbursed or recovered by it, which are not attributable to CMR's gross negligence or willful misconduct, and for which records required hereunder are established contemporaneously with the incurring of such costs and are maintained, for the following Construction Contingency Costs:

4.4.5.1 Unanticipated Events. Costs arising from unanticipated events, including, for purposes of illustration, unanticipated local market labor or materials conditions;

4.4.5.2 Trade Proposer Defaults. Costs incurred as a result of defaults by proposers who submit proposals to CMR for Trade Contracts or as a result of defaults by Trade Contractors or Trade Suppliers.

4.4.5.3 Omissions and Oversight. Interfacing omissions between and from the various Work contingents of the CMR and oversight of Non-Compliant Work to the extent not recoverable from the Trade Contractor, its surety or insurance.

4.4.5.4 Reserved.

4.4.5.5 Reexamination Costs. Costs for uncovering, reexamining, retesting and replacing any Work which the Design Professional demands be uncovered for its observation and which the Design Professional did not inspect within 72 hours of CMR's issuance of a notice of readiness for inspection under Contract Documents, so long as such Work, when uncovered, is found to be in accordance with the Contract Documents.

4.4.5.7 RESERVED

4.4.5.8 Liens. Subject to prior approval of the Board and the surety, costs of liens against subcontractors, pending recovery of costs from the subcontractor at fault.

4.4.6 Adjustments to Construction Contingency.

4.4.6.1 Basis of Adjustments. The contingency costs incurred by CMR under Section 4.4.5 shall be reimbursable to CMR from the Construction Contingency. The amount of the Construction Contingency shall be increased by the net amount of (i) the aggregate by which Trade Contracts entered by CMR are less than line item amounts stated in Design-Builder's construction budget for each particular Trade Contract less (ii) the aggregate amount by which Trade Contracts entered by CMR exceeds the line item amount stated in CMR's construction budget for each particular Trade Contract. All net amounts saved, if any, shall be added to the existing Construction Contingency amount and shall be available for all purposes permitted under Section 4.4.5. Funds from the Construction Contingency may be encumbered by the CMR with written direction from the Board Representative, and approved by the Board on a quarterly basis. Approval of the accounting for the Construction Contingency shall not be unreasonably withheld.

4.4.6.2 Limitations on Adjustments. No claim shall be made for any Construction Contingency costs in excess of the established contingency account plus and adjustments as specified in Section 4.4.6.1 above by CMR for any reason, including a default by Board, or payment of additional compensation to CMR, or any other circumstance which would otherwise permit an increase in the Guaranteed Maximum Price under a GMP Change Order. The Design Professional shall not have any jurisdiction to decide any such claim other than to reject and thereby deny such a claim.

4.4.7 Release of Construction Contingency.

4.4.7.1 Periodic Review. After approval of the GMP Change Order, the Design Professional and the CMR shall review for approval each transfer to and from the Construction Contingency on a periodic basis as requested by the CMR. The Design Professional shall determine if the transfer is in compliance with the contract, and if so, shall issue a Change Order. The CMR shall periodically review its accrued and anticipated Construction Contingency Costs and shall promptly inform Board of CMR's determination of the extent to which the remaining Construction Contingency exceeds CMR's reasonably anticipated Construction Contingency Costs expected to be incurred prior to the issuance of a Final Certificate. CMR shall in good faith negotiate with Board for the release of any surplus of Construction Contingency over such anticipated Construction Contingency Costs so as to permit Board to enhance the Project. Any such release shall be confirmed by Change Order. Release of Construction Contingency shall occur in a timely basis as to allow adequate decision making time for the Board.

4.4.7.1.1 Construction Contingency Change Orders. Each adjustment to the Construction Contingency shall be subject to the provisions of Section 3, "Construction Phase," Part 4, "Changes to the Work."

4.4.7.2 Confirmation of Balance. The amount of any balance of Construction Contingency shall be confirmed by the written certification of the CMR to the Board at each review.

4.4.7.3 Gross Negligence. In no event shall CMR be entitled to reimbursement of any cost attributable to CMR's gross negligence or willful misconduct.

4.4.8 Final Disposition of Construction Contingency. The amount of any funds remaining in Construction Contingency upon the issuance of a Certificate of Final Completion of the entire Project, or upon the earlier termination of this Contract, shall be confirmed by the written certification of the CMR to the Board at the time of the issuance of the Final Certificate and any funds remaining in the Construction Contingency at the time of the issuance of the Final Certificate or at the time of any conversion to a Lump Sum Price and shall be returned to the Board.

4.4.9 Board Option. With respect to any furniture, equipment, or other capital items of a similar nature for which the Board reimburses CMR its Actual Costs of acquisition, upon the termination or expiration of this Contract, and at the election of the Board, CMR shall either deliver such furniture, equipment and other capital items to the Board, or shall credit to the Board the depreciated (normal wear and tear only) value of such items as to which the Board elects not to obtain. The CMR shall protect all such items during the term of this Contract against loss or damage other than normal wear and tear.

4.4.10 Discounts, Rebates, and Other Items. The CMR shall provide the Board an opportunity to provide funds to take advantage of discounts for prompt payment of materials, supplies, equipment, or other items. Any trade or quantity discounts, rebates, refunds, and/or proceeds from the sale of surplus materials or equipments shall be credited to reduce the Cost of the Work.

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PART 5 - LIENS

4.5.1 Public Property Not Subject to Lien. The CMR acknowledges that, pursuant to law, the Site is public property of the THE BOARD OF PUBLIC EDUCATION FOR THE CITY OF SAVANNAH AND THE COUNTY OF CHATHAM and is not subject to lien or levy. The CMR will notify the Board of any liens or levies against the Site of which it becomes aware. The CMR shall cooperate with the Board and shall use its best efforts to assist in securing the release of any liens or levies of which it becomes aware.

4.5.2 Notice of Commencement. (See Section 3.1.7)

4.5.3 Release of Liens. Neither any part of the retainage nor the Payment for Material Completion or Final Payment shall become due until the CMR, if required, shall deliver to the Board a Statutory Affidavit (See Section 7 Forms) providing a complete release of all liens or conditional release of lien upon payment or claims arising out of this contract, or receipts in full in place thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all labor and materials for which a lien or claim could be filed; but the CMR may, if any Subcontractor or claimant refuses to provide a release, furnish a bond satisfactory to the Board to indemnify the Board against any lien or claim. If any lien or claim remains unsatisfied after all payments are made, the CMR shall refund to the Board all monies that the latter may be compelled to pay in discharging such lien or claim, including all costs and reasonable attorney's fees.

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SECTION 5 – CONTRACT ADJUSTMENTS, DISPUTES AND TERMINATION

PART 1 -Board’s Right to Suspend the Work

5.1.1 Board’s Right to Suspend Work. The Board reserves the right, with or without the concurrence of the Design Professional, to suspend the Work at any time or from time to time at the Board’s sole discretion, upon giving CMR five (5) days advanced written notice thereof. If the Board exercises this right and then resumes the Work covered hereby, CMR shall be entitled, upon timely claim to a Change Order, to payment by Board of any reasonable Actual Costs incurred by CMR in connection with the suspension and resumption of the Work, as well as to an extension in the time for performance of the Work to the extent CMR is delayed by Board’s suspension, but only if the suspension of the Work is not due to the act, omission or fault of the CMR.

5.1.2 Board’s Right to Stop Work. The Board reserves the right, for itself, and for any retained Board’s Construction Inspector, upon observation of apparent nonconforming Work, to immediately stop the affected Work at any time by oral direction at the Board’s sole discretion, with notice to be provided to CMR within seventy-two (72) hours. If the Work is later determined by the Design Professional to be in fact conforming Work, then CMR, for the period commencing seventy-two (72) hours after the issuance of the initial stop work order, shall be entitled, upon timely claim to a Change Order, to payment by Board of any reasonable Actual Costs incurred by CMR in connection with the stop work order and resumption of the Work, as well as to a non-compensable extension in the time for performance of the Work to the extent CMR is delayed by Board’s stop-work order beyond the initial seventy-two (72) hours.

5.1.3 Board’s Rights Independent from Rights and Duty of the Design Professional. The rights granted to Board under this Article are independent of the duty and obligation of the Design Professional to stop the Work for nonconforming Work or to issue orders of condemnation for nonconforming Work.

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5.2.1 General Provisions.

5.2.1.1 No Arbitration. There is no agreement to arbitrate any dispute arising under the Contract Documents. Any and all references to arbitration in any of the Contract Documents, including without limitation any exhibits, attachments or references, are hereby deleted and rendered null and void.

5.2.1.2 Continuation of the Work. Unless otherwise agreed in writing, and notwithstanding any other rights or obligations of either of the parties under any Contract Documents or Agreements, the CMR must carry on with the performance of its contract services and the Work, including all duties and obligations hereunder, during the pendency of any claim, dispute, and other matter in question or during any alternative dispute resolution proceeding, court proceeding, or other proceeding to resolve any claim, dispute, and other matter in question, and the Board will continue to make payments in accordance with the Contract Documents. The Board, however, is under no obligation to make payments on or against such claims, disputes, and other matters in question during the time required to resolve such claims, disputes, and other matters in question.

5.2.2 General Claims for Contract Adjustments and Disputes.

5.2.2.1 General Claims of the CMR. Budgeting and cash flow being of material importance to the Board, should the CMR suffer any injury or damage to person or property that CMR reasonably believes a legal basis exists for liability on the part of the Board, Program Manager or Design Professional, and that should result in an adjustment in the Cost of the Work or the Contract Time, such claim shall be made in writing in the form of a Request for Change Order to the Board within fourteen (14) days after such injury or damage is or should have been first observed. Any and all claims not made within said fourteen (14) days are barred, waived, released, and discharged.

5.2.2.2 Protest; Statement of General Claim; Time of Submission. No protest of a claim decision of the Design Professional by the CMR, whether said claim shall be accrued or prospective, shall be valid unless a "Statement of Claim" in writing and accompanied by vouchers and other supporting data shall have been filed with the Board by the CMR not later than thirty (30) days after the Design Professional's decision to reject the claim, time being of the essence. The "Statement of Claim" shall contain a concise and clear recital of the grounds and the legal basis upon which the claim is asserted, including a designation of the provision or provisions of the Contract Documents and the legal basis of liability on which the claim is based. The Statement of Claim shall indicate the dollar amount of the claim and the number of days of adjustment of the Contract Time.

5.2.2.3 Certain Claims Excluded from General Claims.

5.2.2.3.1 All claims for Unavoidable Delay as defined in Section 3.5.8 must be filed and processed pursuant to Section 3.5.10 and are subject to the limitations in the Contract Documents including Section 3.5.7 and 3.5.9.

5.2.2.3.2 All claims concerning designation of a Sole Source must be filed and processed pursuant to the Contract Documents including Sections 2.2.4 or 3.4.6 and are subject to the provisions and limitations therein.

5.2.2.3.3 All claims concerning the Board's rejection of Construction Documents in conjunction with a Construction Document Change Order must be filed and processed pursuant to Section 2.2.3 and are subject to the provisions and limitations therein.

5.2.2.3.4 After execution of the GMP Change Order, all claims to modify the Contract Time or extend the Construction Completion and Occupancy Date must be filed and processed pursuant to Section 3.5.10.

5.2.2.3.5 After execution of the GMP Change Order, all claims to modify the Cost of Work or adjust the GMP must be filed and processed as a request for change order and subject to the processes and limitations set forth in the Contract Documents including Sections 3 and 4. If the requested change order is rejected, a protest may be made as set forth in Section 5.2.2.2 above.

5.2.3 Dispute Resolution.

5.2.3.1 Initial Dispute Resolution. If a dispute arises out of or relates to this Contract or its breach, the parties shall endeavor to settle the dispute first through direct discussions between the parties' representatives who have the authority to settle the dispute. If the dispute is not settled by the parties' representatives, the parties may submit the dispute to mediation in accordance with Section 5.2.3.2.

5.2.3.2 Mediation. If the dispute cannot be settled pursuant to Section 5.2.3.1, the parties may elect to submit the dispute to mediation. The parties agree to conclude such mediation within sixty days of electing mediation. The parties shall select a mutually agreeable mediator and shall share the cost of the mediator equally. Either party may terminate the mediation at any time after the first session, but the decision to terminate shall be communicated directly by the party's representative to the other party's representative and the mediator.

5.2.3.3 Multiparty Proceeding. All parties necessary to resolve a claim shall be parties to any dispute resolution proceedings under this Article. Appropriate provisions shall be included in all other contracts relating to the Work to provide for the consolidation of such dispute resolution procedures.

5.2.3.4 No Litigation. No litigation may be commenced without first following the process in this Article and Georgia Law.

5.2.3.5 Forum Selection. Any claim or controversy arising out of or relating to this Agreement or any breach thereof shall be brought, maintained and pursued only in a state court of competent subject matter jurisdiction located in Georgia's Eastern Judicial Circuit in and for Chatham County, Georgia. The Parties hereby agree in advance to consent to personal jurisdiction in any state court of competent subject matter jurisdiction in Chatham County, Georgia, and agree in advance to waive the defense of personal jurisdiction in any action arising out of or relating to this Agreement or any breach thereof that is brought in Chatham County, Georgia. The Parties further agree that any state court of competent subject matter jurisdiction in Chatham County, Georgia, will be a proper venue for any action arising out of or relating to this Agreement or any breach thereof and agree in advance to waive the defense of improper venue in any such suit.

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PART 3 – TERMINATION

5.3.1 Board's Right to Terminate Contract Without Cause.

5.3.1.1 Board's Right to Terminate. If Board determines the Project lacks feasibility or for any other reason, in its sole and complete discretion, elects to forego the Project's construction, the Board shall have the right, upon thirty (30) days prior written notice to the CMR, to terminate this Contract without cause and irrespective of whether or not CMR is in default of any of its obligations hereunder.

5.3.1.2 Termination Prior to Entry of GMP Change Order.

5.3.1.2.1 CMR Fee. In the event such termination occurs prior to any Construction Order, or after all Work under any issued Construction Orders has been finally completed, the Board shall pay CMR the sums due for the CMR Fee earned to the date of termination, not exceeding the unpaid balance of the Preconstruction Fee. For purposes of calculation, the CMR Fee shall be deemed earned only to the extent of an amount that bears to the total Fee the same ratio that the Work in place at the time of termination bears to the total Work, as reasonably determined by the Design Professional.

5.3.1.2.2 Prior to GMP Change Order, Items for Which Payment Shall Be Made. In the event such termination occurs prior to the entry of the GMP Change Order, the Board shall pay CMR the reasonable termination expenses for:

- (a) Sums due for authorized Preconstruction Fees earned prior to termination, but not exceeding the remaining unpaid balance of the Preconstruction Fee;
- (b) Any unpaid Actual Costs, Contingency Costs and lump sum amounts due under Construction Orders, incurred or earned to the date of termination;
- (c) Any other costs, not exceeding the unpaid balance of the aggregate of all approved Change Order and Construction Order Sums attributable to the termination (including, by way of illustration only, cancellation charges owed to and other incurred obligations, commitments and claims of Trade Contractors or Trade Suppliers) and for which CMR is not otherwise compensated; and
- (d) Fair compensation by purchase or rental (at Board's election), for any equipment retained by Board, to the extent it has not already paid for same as an item of Actual Cost.

5.3.1.3 Termination After GMP Change Order. Should such termination occur after the entry of the GMP Change Order, the Board shall pay CMR, up to the unpaid balance of the GMP, for (1) all Actual Costs, Contingency Costs and lump sum amounts earned to the date of such termination; (2) all other costs attributable to the termination (including by way of illustration only cancellation charges owed to and other incurred obligations, commitments and claims of Trade Contractors or Trade Suppliers) and for which CMR is not otherwise compensated; (3) a proportionate amount of CMR's Fee that bears to the total Fee under the GMP Change Order the same ratio that the Actual Cost and lump sum amounts due with respect to the Work in place at the date of termination bears to the Estimated Cost Component of the GMP Change Order; and (4) fair compensation by purchase or rental (at Board's election), for any equipment retained by Board, to the extent it has not already paid for same as an item of Actual Cost or Contingency Cost.

5.3.1.4 Condition Precedent to Payment. As a condition precedent to receiving the payment set forth in this Section 5.3.1, CMR shall deliver to the Board all papers, documents, assignments and agreements relating to the Project, in particular the Construction Documents (including Board ownership and copyright thereof) as set forth in the Contract Documents.

5.3.1.4.1 Assignment. If requested, the CMR shall assign to the Board or to an entity of Board's choice all of CMR's contractual rights in respect thereof, so that the assignee shall be fully vested with all rights and benefits of CMR under such papers, documents and agreements, together with releases and waivers of lien in the same manner as would be required upon Final Completion. The Board may also request the assignment from CMR to Board or to the entity of Board's choice of all Trade Contracts entered into by CMR under Construction Orders and in that event the assignee shall be solely obligated to the Trade Contractors or Trade Suppliers under such Trade Contracts for all sums payable thereunder and not previously paid by the Board to CMR.

5.3.1.4.2 Cessation of Entitlement. Upon the CMR's assignment of agreements, contracts, Trade Contracts and/or Board's payment of monies due CMR as provided in Section 5.3.1.4.1 above, CMR shall be entitled to no further compensation of any kind from Board and shall have no further obligation with regard to the assigned agreements, contracts, or Trade Contracts, except to guarantees and warranties for self-performed Work and Work performed under CMR's supervision.

5.3.2 Board's Right to Declare Default and/or Terminate Contract for Cause.

5.3.2.1 Board's Right to Terminate. If CMR makes a general assignment for the benefit of its creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails, except in cases for which extensions of time are provided, to supply enough properly skilled workmen or proper materials, or if it fails to make proper payment to Trade Contractors for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over the Project, or if it fails to diligently prosecute the work in accordance with the User's Program, the Construction Documents, or the Contract Documents, or if it otherwise is guilty of a substantial violation of any provision of this Contract, then the Board may, without prejudice to any right or remedy and after giving the CMR and its surety, if any, ten (10) days' written notice of the Board's Intent to Declare Default, during which period the CMR fails to cure or fails to commence and thereafter diligently prosecute Work necessary to cure the violation, declare the CMR to be in Default and to terminate the employment of the CMR.

5.3.2.2 Default or Termination Prior to GMP. If such default or termination occurs prior to entry of any Construction Order or GMP Change Order, Board shall pay all Consultation Fees earned prior to termination less such damages as may be incurred by Board by reason of such termination.

5.3.2.3 Default or Termination after a Construction Order or GMP. Upon default or termination of this Contract as set forth above after entry of a Construction Order or GMP Change Order, the Board shall have the right to take possession of the Work, together with all materials, equipment, tools and improvements thereon and to finish the Work by whatever reasonable method the Board may deem expedient. In such case, CMR shall not be entitled to receive any further payment until the Work is completed and shall take all necessary steps, including the legal assignment of its contract rights, as the Board may require for the purpose of fully vesting in the Board or the entity of Board's choice the rights and benefits of CMR under such obligations or commitments as the Board may elect. Upon final completion of the Work governed by Change Orders then in force (including the GMP Change Order), CMR shall pay the Board the amount, if any, that the total cost of completing the Work governed by Change Orders in force at the time of default or termination (including the GMP Change Order), plus any damages recoverable by Board for delays in completion, together with amounts previously paid to CMR, exceeds the amount stated in the Change Orders (including the GMP Change Order) in force at the time of said default or termination. If there is no such excess, the Board shall pay CMR any portion of the Actual Cost and lump sum amounts due with respect to the Work and the CMR's Fee that has not previously been paid and that was owed to CMR at the time of termination under Change Orders then in force, so long as the total amount paid by the Board for completing the Work under such Change Orders, including all costs and damages incurred by the Board as a result of any delay in completion, and all amounts previously paid to CMR, do not exceed the amount stated in the Change Orders (including the GMP Change Order) in force at the time of termination.

5.3.2.4 Board's Right to Prosecute the Work. Time being of the essence, if the CMR shall be declared in default or shall fail or neglect to carry out the Work in accordance with the Contract Documents, or fail to otherwise fully comply with its obligations under this Contract, both the CMR and the Surety agree that the Board may, after giving the CMR and Surety twenty five (25) calendar days written notice, without prejudice to any other remedy and without invalidating the performance bond, make good such deficiencies and may deduct the cost thereof from payment due the CMR or at the Board's option, the Board may terminate this Contract and take possession of the Site and of all materials, equipment, tools and construction equipment and machinery thereon owned by the CMR and finish the Work by whatever method the Board shall deem expedient.

5.3.2.5 Cost of finishing the Work. If the costs of finishing the Work (including, without limitation costs incurred for additional, architectural or consulting services made necessary thereby) exceeds the unpaid balance of the Contract Sum (as applicable), CMR shall pay the difference to the Board within ten (10) days of the Board's request. The obligations for payment set forth in the Section shall survive the termination of this Agreement.

5.3.2.6 Additional Costs. Should termination result from CMR's default or if CMR shall default in any provision of the Contract Documents, Board may recover from CMR the amount of any damages, whether liquidated or un-liquidated, suffered or incurred as a result of this default, including without limitation, reasonable attorney's fees, including appeals, penalties, increased costs and lost profits. The Board may deduct and withhold from payments otherwise due CMR the amount of any of the foregoing losses and damages, which deduction shall be deemed credits or back charges against any amounts coming due under this Agreement.

5.3.2.7 Effect of Later Judicial Determination. In the event a court of competent jurisdiction determines (or the parties agree to settle with a consent determination) that a termination for default is wrongful or not the fault of the CMR, the termination shall be considered to be a Termination Without Cause and the sole remedy available to the CMR shall be the contractual treatment of the termination pursuant to Section 5.3.1 above and without any other damages or relief.

5.3.3 CMR's Right to Terminate.

5.3.3.1 CMR's General Right to Terminate. If the Project, in whole or substantial part, is stopped for a period of thirty (30) days or more under an order of any court or other public authority having jurisdiction over the Project, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the CMR, or should the Work be suspended by Board under Section 5.3.3 for a period of more than thirty (30) days, then the CMR may, upon seven (7) days' written notice to the Board, terminate this Contract and, upon providing Board with all releases and waivers of lien in the same manner as would be required upon Final Completion, recover from the Board payment of Actual Costs, and lump sum amounts due for all Work properly executed, the CMR's Fee earned to date, and, upon timely claim therefore, for any proven loss sustained or cost incurred upon any materials, equipment, tools, construction equipment and machinery, and cancellation charges on existing obligations of the CMR.

5.3.3.2 CMR's Right to Terminate for Nonpayment. If the Board fails to pay the CMR an approved payment when payment is due and all required approvals, terms and conditions for payment have been met, the CMR must give written notice of the CMR's intention to terminate this Contract. If the Board fails to provide the CMR an approved payment or written notice of a dispute as to the amount sought by the CMR within thirty (30) days after receipt of the CMR's written notice, the CMR may terminate this Contract. Upon such termination the Board will pay the CMR the for the Work properly executed, the CMR's Fee earned to date, and, upon timely claim therefore, for any proven loss sustained or cost incurred upon any materials, equipment, tools, construction equipment and machinery, and cancellation charges on existing obligations of the CMR.

5.3.3.3 Limitation on Fee. The CMR Fee shall be deemed earned only to the extent of an amount that bears to the total fee the same ratio that the Work in place at the time of termination bears to

the total Work, as reasonably determined by the Design Professional, and approved by the Board

5.3.4 Termination for Abandonment by CMR. Both the CMR and the Surety under any bond furnished for the Project, agree that the Board, after fourteen (14) calendar days' written notice to the CMR, may terminate this Contract if the CMR abandons the Project. If such termination occurs, the Board shall pay the CMR for Work completed and for the CMR's actual expenses for materials, equipment, tools and construction equipment and machinery, less any costs the Board incurs in re-contracting and the start-up of a replacement for the CMR and the additional costs the Board incurs in completing the Project as a result of the termination of the CMR.

5.3.5 Notices of Termination. Notwithstanding any other provision of this Contract, if the either party elects to terminate this Contract regardless of reason, the terminating party will issue a written Notice of Termination or of Default to the terminated or defaulted party by Certified Mail, Return Receipt Requested.

5.3.6 Cumulative Remedies. Except as otherwise provided herein, each right and remedy provided for in this Contract shall be cumulative and shall be in addition to every other right or remedy provided for in this Contract as now or hereafter existing at law or in equity or by statute or otherwise, and the exercise or beginning of the exercise of any one or more of the rights or remedies provided for in this Contract as now or hereafter existing at law or in equity or by statute or otherwise shall not preclude the simultaneous or later exercise of any or all other rights or remedies provided for in this Contract as now or hereafter existing at law or in equity or by statute or otherwise.

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SECTION 6 - PROJECT COMPLETION PART 1 – PREPARATION FOR MATERIAL COMPLETION

6.1.1 Prerequisites.

6.1.1.1 Completion of the Work. The CMR must attain Material Completion as defined in Section 6.1.2 below prior to any occupancy of the Project.

6.1.1.2 Submission of Final Documents. All final documents as defined herein are due at Material Completion.

6.1.1.3 Operation of Building Systems. All building systems specified in Section 6.2.1.2.7 are to be started up and tested to confirm operation. In accomplishing this certification, the CMR shall obtain the manufacturer's certificates and coordinate the initial start-up and testing of building systems. The CMR expressly agrees that the manufacturers are solely the agents of the CMR. In all cases where the equipment of two or more manufacturers ties in and functions together, the CMR shall require the field representatives to perform simultaneously the initial start-up, the testing, and the placing of their equipment into operation. "Start-up" is defined as putting the equipment into action. "Testing" is defined as performing such testing as is stipulated in the Contract Documents to be performed. "Placing into operation" is defined as operating the equipment for a sufficient period of time for the determination to be made that it is performing properly. All building commissioning activities should be completed, with the exception of those designated as "Permitted Incomplete Work."

6.1.1.4 Operation and Maintenance Training. Prior to Material Completion, the CMR shall furnish advance copies of proper written instructions to the Board and SCCPSS on operation and maintenance of all mechanical, electrical and other operating systems and equipment. The CMR shall provide training in the operation and maintenance of all mechanical, electrical and other operating systems and equipment in the presence of the Design Professional and Board to the SCCPSS and shall give notice in writing to the Design Professional, Board and SCCPSS at least fifteen (15) days prior to the date it is proposed for the training. The presence of a Commissioning Authority shall not diminish the responsibility of the CMR to perform and administer this Operation and Maintenance Training.

6.1.1.5 Operation and Maintenance Manuals, Brochures and Data. At least seven (7) days prior to the proposed date of Inspection for Material Completion, the CMR shall furnish and deliver to the Design Professional complete manuals, brochures and data as prepared and published by the manufacturers covering details of operation and maintenance for all items equipment, systems or apparatus installed which require operation or maintenance after occupancy. The Design Professional will review this submittal for compliance and deliver documents to the Board and SCCPSS at Material Completion.

6.1.1.6 Test and Balance Report. A copy of the initial test and balance report on the heating, ventilating and air conditioning system shall be submitted to the Design Professional at least seven (7) days prior to the proposed date of Inspection for Material Completion. Two additional Test and Balance Reports are required after Material Completion and Occupancy (See Section 6.4.7).

6.1.2 Material Completion.

6.1.2.1 Material Completion Defined. Material Completion is when the Work or designated portion thereof is complete in accordance with the Contract Documents so that the Board and SCCPSS can occupy and utilize the Work for its intended use. Material Completion shall require building commissioning and complete operation of all applicable building systems including, but not limited to, mechanical, electrical, plumbing, fire protection, fire alarm, telecom, data, security, elevators, life safety, and accessibility. The Work shall be complete except for Minor Items or Permitted Incomplete Work or Warranty Complaint Items (See Section 6.5.2).

6.1.2.1.1 Minor Item Defined. A Minor Item is a portion or element of the Work:

- (a) that can be totally complete within thirty (30) days; and
- (b) that can be completed while the SCCPSS occupies the Work without impeding or interfering with either the SCCPSS' use and occupation of the Work or the CMR's ability to complete the Minor Item; and
- (c) that will not interfere with the complete use and enjoyment of the project by the SCCPSS.

6.1.2.1.2 Permitted Incomplete Work Defined. Permitted Incomplete Work is work that is incomplete through no fault of the CMR, as determined by the Board, including, but not limited to, HVAC seasonal test and balance (See Section 6.4.7), seasonal landscaping, scheduled elevator inspection or maintenance, incomplete work due to failure of Separate Contractors to complete work, and the like.

6.1.2.2 Material Completion Date. Material Completion shall be achieved on or before the Material Completion Date specified in the Contract as amended by Change Orders. Failure by the CMR to achieve Material Completion by not later than the Material Completion and Occupancy Date, as amended, shall be sufficient cause for the assessment of Liquidated Damages.

6.1.2.3 No Partial Occupancy; Exceptions. No partial occupancy of the Project or the Work shall be permitted, unless expressly addressed in the Supplementary General Requirements or elected by the Board via a properly executed Change Order. In the event the Board otherwise elects to have a partial occupancy of the Project after execution of this agreement, which decision shall be at the sole discretion of the Board, a Change Order will be executed. A partial occupancy will follow all the requirements for Material Completion for the specific area of the Project that is to be accepted and turned over to the Board.

6.1.3 Effect of Achieving Material Completion. Upon the date when Material Completion is achieved, the following matters are conclusively determined:

6.1.3.1 Occupancy of the Work. The SCCPSS may immediately occupy and secure the Work without restriction except as provided in Section 1 Part 4 and Sections 1.7.4 and 6.4.5.

6.1.3.2 Warranty Periods. All warranties begin to run from the date Material Completion is achieved.

6.1.3.3 Utilities. All utilities become the responsibility of the SCCPSS.

6.1.3.4 Insurance. SCCPSS is responsible for all insurance for the Project.

6.1.3.5 Liquidated Damages. The Liquidated Damages daily rate is reduced to zero.

6.1.3.6 Payment for Material Completion. The CMR may request payment of the remaining contract balance, including retainage, less amounts credited the Board or incurred as liquidated damages, and less amounts withheld for the Punchlist by reason of Minor Items or Permitted Incomplete Work (See Section 6.6.3.2).

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PART 2 – Documents and Deliverables

6.2.1 Final Documents Due at Material Completion.

6.2.1.1 Final Documents Defined. Final Documents consist of all certificates, warranties, guarantees, manuals, instructions and documents as required by the Contract Documents.

6.2.1.2 Schedule of Delivery of Final Documents. All Final Documents are due at Material Completion. Certain documents require prior approval from the Design Professional and other documents and deliverables require coordination with the Using Agency. The CMR shall coordinate the assemblage, approval and delivery of Final Documents to correlate with the scheduled Material Completion Date and completion of the Construction Professional's Checklist for Material Completion (Section 7 Forms). These documents and deliverables include but are not limited to the following:

6.2.1.2.1 Affidavits.

(a) A non-influence affidavit in the exact form as shown in Section 7, Forms.

(b) A statutory affidavit in the exact form as shown in Section 7, Forms.

6.2.1.2.2 Bonds.

(a) A Five Year Bond of Roofs and Walls as shown in Section 7, Forms, written by a surety authorized to do business in the State of Georgia and in the penal sum of the actual cost of the walls, wall cladding, wall insulation, roof, insulation and roof deck, but not less than the amount shown in the approved initial breakdown for roof and wall systems. The effective date of the Bond shall be the Material Completion Date.

(b) Any Bonds to Discharge Claim issued to Trade Contractors and suppliers as shown in Section 7, Forms.

6.2.1.2.3 Written Guarantees and Warranties. All written guarantees or warranties as called for in the Specifications. Each written guarantee or warranty shall specify the term and contact information for enforcement and shall be in such form as to permit direct enforcement by the Owner against any Trade Contractor, subcontractor, materialmen, or manufacturer related to the guarantee. The effective date of all warranties and guarantees shall be the Material Completion Date.

6.2.1.2.4 Marked-up Construction Documents. The CMR shall provide a complete set of Marked-up Construction Documents to the Design Professional, which set shall reflect all changes caused by addenda, field changes, Change Orders, or observed changes by the CMR or subcontractor(s) for the purpose of the Design Professional's issuance of Record Documents to the Owner.

6.2.1.2.5 Operation and Maintenance Manuals. Receipts for transmittal of Operation and Maintenance Manuals, Brochures and Data to the Design Professional (or Commissioning Agent) as required by Section 6.1.1.5.

6.2.1.2.6 Certification of Building Systems' Operations. A certification by the CMR that all building systems specified in Section 6.2.1.2.7 are operational. The CMR expressly agrees that the manufacturers are solely the agents of the CMR. In accomplishing this certification, the CMR shall obtain the manufacturer's certificates and coordinate the initial start-up and testing of building systems.

6.2.1.2.7 Certificates of Manufacturers for Major Components. For elevators, moving walks, dumbwaiters, escalators, lifts, major components of air conditioning systems (i.e., cooling towers, compressors, condensers, absorption units, chiller units, fan coil units, air handling units, boilers, base mounted pumps, and temperature controls); major components of heating systems (i.e., boilers, base mounted pumps, air handling units, unit ventilators, fan coil units, temperature

controls, and boiler chemical feed systems); major components of plumbing systems (i.e., boilers, base mounted pumps, sewage pumps and water treatment systems) and incinerator systems; start-up, testing, and placing into operation shall be performed by the field representative(s) of the manufacturer(s), and certificate(s) of the manufacturer(s) shall be filed with the Owner on the letterhead(s) of the manufacturer(s) in which the manufacturer(s) certifies or certify that "the equipment has been installed in strict compliance with the recommendations of the manufacturer(s) and is operating properly," in the format shown in Section 7, Forms. The manufacturer shall list in the certificate the item or items furnished to the job and the date, name, or other positive means of identifying any supplementary documents containing the recommendations of the manufacturer, with a copy of each of the supplementary documents attached to the certificate.

6.2.1.2.8 Certificates of Manufacturers for Products. Where required by the specifications, Certificates of Manufacturers for products and other materials (not Major Components) shall be provided using the manufacturer's certificate format.

6.2.1.2.9 Final Certification of Costs. For proper capital asset reporting of the Project, the CMR shall submit his Final Certification of Costs in the format set forth in Section 7, Forms.

6.2.1.3 Presentation of Final Documents. Final Documents will be arranged by category and delivered at or before Material Completion in a format suitable for the presentation, use and retention of the documents. Three (3) sets of each document are required with originals in one set of documents.

6.2.1.3.1 Warranties, Guarantees, and Manufacturer's Certificates shall be in a separate three ring binder(s) with summary list of contents. After approval Owner shall retain the original set and furnish two copies to Using Agency.

6.2.1.3.2 Affidavits and Bonds shall be presented in a separate three ring binder. After approval, Owner shall retain the original set and furnish two copies to Using Agency.

6.2.1.3.2 Operation and Maintenance Manuals shall be in three ring binders or manufacturer's binder. If documents are provided on electronic format (CD/DVD), one printed copy is required plus two (2) disks. After approval Owner shall furnish Using Agency original set plus two copies.

6.2.2 Deliverables

6.2.2.1 Keys. Keys with tags attached indicating number and/or description of door or room each key is intended to fit attached to each key shall be delivered to the Owner and Using Agency. CMR shall prepare and furnish with the keys an itemized key schedule in quintuplicate listing the door or room number and/or description, serial number of key, and number of keys being delivered for each door or lock.

6.2.2.2 Attic Stock and Loose Equipment. If the Contract Documents provide for the furnishing of any loose equipment or furnishings or attic stock of materials, the CMR shall make arrangements to locate such material in a secure location at the Project site to facilitate inspection by the Design Professional, Owner and transfer to the Using Agency at Material Completion.

6.2.2.3 Equipment List. Provide Equipment List (Excel) including manufacturer, model and serial number for the following items: water source heat pumps, circulating pumps, filter sizes, kitchen equipment, water heaters/boilers, heat exchangers, cooling towers, and other items as directed by the Owner.

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PART 3 – INSPECTIONS FOR MATERIAL COMPLETION

6.3.1 General Responsibility of the CMR for Inspection. The CMR acknowledges and agrees that he has an indivisible, non-delegable, and nontransferable contractual obligation to the Board to make his own inspections of the Work at all stages of construction; and he shall supervise and superintend performance of the Contract in such manner as to enable him to confirm and corroborate at all times that all work has been executed strictly, literally, rigidly, and inflexibly in accordance with the methods and materials designated in the Contract Documents. The CMR's inspections are also for the purpose of permitting the CMR to accurately represent that (a) his certifications on periodical estimates are true and correct and (b) his notices of readiness for inspections are true and correct. Accordingly, the CMR acknowledges and agrees that he may not defend or excuse any deviation from the Contract Documents on the ground (a) that the deviation was not brought to his attention by another person or party or other persons or parties or (b) that a subcontractor is or subcontractors are at fault.

6.3.2 Notice of Readiness for Inspection for Material Completion.

6.3.2.1 Preparation of Initial Punchlist. Prior to the Material Completion Date, the CMR shall correct all non-compliant or incomplete work. The CMR shall then prepare an "Initial Punchlist" itemizing to the best of the CMR's knowledge all Minor Items and Permitted Incomplete Work (as defined in Section 6, Part 1) and provide a copy of the Initial Punchlist to the Design Professional and Board. The CMR is encouraged to consult with the Design Professional prior to finalizing the Initial Punchlist, in particular in arriving at consensus for Minor Items and Permitted Incomplete Work.

6.3.2.2 Notice of Readiness for Inspection for Material Completion. After or simultaneously with the provision of the Initial Punchlist, the CMR shall give the Design Professional and Board written notice requesting inspection for Material Completion in the following words:

The work on the Contract for the [show name of Project as it appears in the Contract] having been Materially Completed, it is requested that an Inspection for Material Completion be made promptly by the Design Professional in accordance with Section 6 of the General Conditions. The Initial Punchlist, to the best of the CMR's knowledge, is attached hereto.

6.3.2.3 No Inspection without Notice. No Inspection for Material Completion shall be made until such time as the Design Professional and Board have received notice in the exact form indicated above. In the event the CMR shall have issued the "Notice of Readiness for Inspection for Material Completion" prematurely, hereinafter referred to as a "false start," the CMR shall be liable for the damage resulting from the false start including, but not limited to, additional fee claims from the Design Professional for extra site visits.

6.3.3 Conducting the Inspection for Material Completion. The Design Professional shall conduct the Inspection for Material Completion. The Design Professional shall confirm the Initial Punch List and shall add or delete such Minor Items or Permitted Incomplete Work as shall be appropriate. Where appropriate, the Design Professional shall assign completion dates for the items of Permitted Incomplete Work. At the completion of the Inspection for Material Completion, the resulting punch list shall become the "Final Punch List" and also documented as a final "Notice of Non-Compliance".

6.3.4 Executing Material Completion Certificates and Occupancy by the Board. When the Design Professional completes the Final Punch List (Five (5) days allowed), the Board, CMR, and Design Professional are prepared to execute the Material Completion Certificates (See Exhibits) for occupancy. The Board administers the execution and distribution of the Material Completion certificates on the Material Completion date.

6.3.4.1 Construction Professional's Material Completion Checklist. This form is a recital of submittals and requirements for Material Completion provided as a guide to this Section 6 Project Completion.

6.3.4.2 Design Professional's Certificate of Material Completion. This certificate confirms inspection of the work by the Design Professional and representation as to Material Completion; establishes the Final Punch list (Notice of Non-Compliance); and, recommends the amount to be withheld as contingency.

6.3.4.3 Board's Certificate for Material Completion and Occupancy. This certificate authorizes the Board to occupy the Work, secure the site and assume operations.

6.3.5 Notification of Board of Site Visits by the CMR or Trade Contractors. Following the successful completion of the Inspection for Material Completion the CMR and his Trade Contractors or subcontractors shall make no visits to the site without first giving notice to the Board.

6.3.6 Effect of Failure to Achieve Material Completion. Should Material Completion not be achieved by the Material Completion Date, as amended, the following matters are conclusively determined:

6.3.6.1 Breach of Covenant of Time. As time is of the essence in the completion of the Work, the CMR is in breach of the covenant of time and is subject to default.

6.3.6.2 Liquidated Damages. Liquidated Damages at the specified daily rate in the Contract begin to accrue and are payable on the day immediately following the Material Completion Date.

6.3.6.3 Extension of Time. While it is anticipated that all applications of the CMR for additional time or extensions of the Material Completion Date would have been filed and determined by the Board prior to the Material Completion Date, the CMR may, within 10 days after the Material Completion Date, file for any additional extensions of time pursuant to Section 3, Part 4, and the collection, but not the accrual, of Liquidated Damages shall be suspended until the Board's decision. Should such a belated application be filed after the 10-day period, the Board, in its sole discretion, may continue to collect Liquidated Damages. Should the Board grant any applications for extension of time and the Material Completion Date, Liquidated Damages shall be adjusted accordingly.

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PART 4 – PAYMENT FOR MATERIAL COMPLETION

6.4.1 Payment for Material Completion. Payment for Material Completion shall be due thirty (30) days after receipt by the Board of the application for payment upon achievement and certification of Material Completion, provided that Final Documents shall have been submitted. Payment shall be made by a check payable jointly to the CMR and surety and shall be mailed to the surety.

6.4.2 Application for Payment for Material Completion.

6.4.2.1 Certification of CMR. The CMR shall certify, over his own signature, that the Work provided for by the Contract Documents has been completed under the terms and conditions thereof, and that the entire balance of the contract, including retainage, is due and payable, except for those amounts determined by the Design Professional to be withheld due to credits due to the Board and Minor Items or Permitted Incomplete Work pursuant to Section 6.6.3 below.

6.4.2.2 Supporting Documentation.

6.4.2.2.1 Financial Data. The CMR shall submit evidence satisfactory to the Design Professional that all payrolls, material bills, and other indebtedness connected with the work have been paid.

6.4.2.2.2 Affidavits and Bonds. The CMR shall attach copies of the affidavits and bonds set forth in Sections 6.4.2.2.1, execute the payment certification and forward it directly to the Design Professional.

6.4.3 Release of CMR's Retainage.

6.4.3.1 Establishment of List. At the completion of the Inspection for Material Completion, the Design Professional and CMR, with the consent of the Board, shall develop the Final Punchlist. The Design Professional will assign a value for each the Minor Items and Permitted Incomplete Work.

6.4.3.2 Establishment of Amount of to be Withheld for Punchlist Items. In general, the amount to be withheld from the Payment for Material Completion and to be paid upon Final Completion shall be equal to 200% of the Design Professional's value of completing the Work for each Minor Item or Permitted Incomplete Work. The following additional amounts to be withheld shall be applied where applicable.

6.4.3.2.1 Mechanical and HVAC Systems. Until such time as the Design Professional shall have certified that the heating system has been balanced under reasonable weather conditions, the amount withheld shall in no event be less than \$1,000.00.

6.4.3.2.2 Certificates. For each certificate required for major components a sum of \$500.00 shall be withheld until such certificate shall have been filed with the Board.

6.4.4 Effect of Payment for Material Completion and Release of Claims. Board shall process the Payment for Material Completion as expeditiously as possible in accordance with the certification of the Design Professional, but interest shall not accrue until thirty (30) days have elapsed from receipt, unless error is found in the application or supporting documents. Acceptance of Payment for Material Completion by the CMR shall operate as settlement, waiver, release, discharge and payment in full of all claims against Board of any nature arising out of the Project except for the work associated with the Minor Items and the Permitted Incomplete Work.

6.4.5 Notification of Readiness for Interim Inspection for Punch list Completion. Not more than 30 days after Material Completion, and upon completion of the Final Punch list (including all Minor Items and such Permitted Incomplete Items as are due to be completed), the CMR shall give the Design Professional and board written notice requesting inspection for Final Completion in the following words:

The work on the contract for the [SHOW NAME OF PROJECT AS IT APPEARS IN THE CONTRACT] having been 100% completed, except for Permitted Incomplete Work not yet due to be completed, it is requested that an Inspection for Final Completion be made promptly by the Design Professional in accordance with Section 6 of the General Conditions.

No Inspection for Interim Inspection for Punch list Completion shall be made until such time as the Design Professional and Board have received notice in the exact form indicated above. In the event the CMR shall have issued the “Notice of Readiness for Interim Inspection for Punch list Completion” prematurely, hereinafter referred to as a “false start,” the CMR shall be liable for the damage resulting from the false start including, but not limited to, the salaries, professional fees, and travel and living expenses of the persons or parties inconvenienced by the false start.

6.4.6 Conducting the Interim Inspection for Punch list Completion. The Design Professional shall conduct the Interim Inspection for Punch list Completion. The Design Professional shall confirm the Final Punch List has been completed including all Minor Items. Upon successful completion of the inspection, the Design Professional shall issue a Report of Interim Inspection for Punch list Completion, noting any Permitted Incomplete Work which remains to be accomplished and the date by which it is to be completed. In the event all Permitted Incomplete Work has been completed at the time of this Interim Inspection, and the Design Professional so certifies, then this inspection shall be deemed an Inspection for Final Completion. In the event any Minor Item is determined to be incomplete, the Board may give the fourteen (14) day notice of failure to complete the Work set forth in Section 6.2.3.

6.4.7 Seasonal Test and Balancing of HVAC Systems. The CMR shall provide two additional Test and Balance Reports after the Material Completion Date and Occupancy by the Board. One Report shall be prepared on or about the peak cooling season and the second on or about the peak heating season. These two reports are in addition to the Initial Test and Balance Report submitted at Material Completion and prior to occupancy.

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PART 5 – CORRECTION OF WORK AFTER MATERIAL COMPLETION

6.5.1 Non-Compliant or Defective Work.

6.5.1.1 Duty to Correct. Neither (1) the Design Professional's Certificate of Material Completion, (2) nor any decision of the Design Professional, (3) nor payment, (4) nor any provision in the Contract shall relieve the CMR of responsibility for faulty materials, faulty workmanship, or omission of contract work, and he shall remedy any defects or supply any omissions resulting therefrom and pay for any damage to other work resulting therefrom.

6.5.1.2 Notice of Non-Compliant or Defective Work. The Board or a SCCPSS Representative shall give notice of observed defects or omissions with reasonable promptness. The notice shall be in the form of a Warranty Complaint letter, sent by statutory mail or electronic transmission to the CMR by the Board; or, a Notice of Non-Compliant Work issued by the Design Professional (Section 3 Part 6).

6.5.2 Warranty Complaint Procedure.

6.5.2.1 Notice of Warranty/Guaranty Complaint Items. The Board acknowledges that many malfunctions in building equipment and systems do not constitute Non-Compliant or defective Work. Accordingly, the Board may provide notice of such apparent warranty work by a Warranty Complaint letter, sent by statutory mail or electronic transmission to the CMR. The letter should outline, in non-technical language, the complaint item. In emergency situations, the initial notification may be oral by the Board to a person or office designated by the CMR. The CMR shall respond promptly to all such notices.

6.5.2.2 Duty to Correct. During the one year period of the warranty and guarantee any defects of material or workmanship that become apparent shall be the responsibility of the CMR until and unless the CMR can show abuse or design defect. The CMR shall immediately correct all defects that become known during the one year period at not cost to the Owner unless notice is given to the Design Professional and Board, prior to correcting the defect that the cause of the defect is the result of abuse or design deficiency.

6.5.2.2.1 Initial Response. When the Board or the Design Professional notifies the CMR of a defect, the CMR will visit the site to review the complaint within five (5) days and shall promptly correct the Work. If the CMR fails to respond within this time limit, the Board may correct the defect or malfunction and charge the CMR for the Work. The CMR shall give notice in writing to the Board when corrections have been completed.

6.5.2.2.2 Design Defect or User Abuse. If the CMR believes that a design defect or user abuse has caused the malfunction or defect, he will notify the Design Professional and the Design Professional will issue a formal decision in his capacity as Design Professional and impartial interpreter of the conditions of the contract. If it is determined the complaint is not the responsibility of the CMR, the CMR shall be promptly paid for the cost of the corrective work.

6.5.2.2.3 Emergency Situations. If the condition is an emergency, this will be communicated to the CMR with the request that no matter what he finds, corrections are to be accomplished immediately. The CMR shall respond to the notice of emergency situations within twenty-four (24) hours. If the CMR fails to respond within this time limit, the Board may correct the defect and charge the CMR for the Work. If it is determined the complaint is not the responsibility of the CMR, the CMR shall be promptly paid for the cost of the corrective work. The CMR shall give notice in writing to the Board when corrections have been completed.

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6.5.3 Warranty and Guarantee

6.5.3.1 Obligation for Correction of the Work. The CMR shall within the space of time designated in Notices of Non-complying Work and without expense to the Board, correct, remedy, replace, re-execute, supply omitted work, or remove from the premises all work designated as Non-complying by the Design Professional. The CMR shall give prompt notice in writing to the Design Professional, with copy to the Board, upon completion of the supplying of any omitted work or the correction of any work designated as Non-complying by the Design Professional. In the absence of said notice, it shall be and is presumed under this Contract that there has been no correction of the Non-complying work or supplying of omitted work. If the CMR does not remove, make good the deficiency, correct, or remedy faulty work, or supply any omitted work within the space of time designated in Notices of Non-complying Work without expense to the Board, the Board, after ten (10) days' notice in writing to the CMR, may remove the work, correct the work, remedy the work or supply omitted work at the expense of the CMR. In case of emergency involving health, safety of property, or safety of life the Board may proceed at once with correction of the Work without waiving any rights of the Board. Correction of defective work executed under the plans and specifications or supplying of omitted work whether or not covered by warranty of a subcontractor or materialmen, remains the primary, direct responsibility of the CMR. The foregoing obligation of the CMR shall remain in effect until the expiration of the statute of limitations covering the Work.

6.5.3.2 One Year Warranty and Guaranty. As additional security for the fulfillment of such obligation, but in no way limiting the same, the CMR warrants and guarantees (1) that all work executed under the plans and specifications shall be free from defects of materials or workmanship for a period of one year from the date of the Final Certificate of the Design Professional, and (2) that for not less than one year from the date of the Final Certificate of the Design Professional, or for such greater space of time as may have been designated in the specifications, products of manufacturers shall be free from defects of materials and workmanship. Whenever written guaranties or warranties are called for, the CMR shall furnish the aforesaid for such period of time as may be stipulated. The aforesaid instruments shall be in such form as to permit direct enforcement by the Board against any subcontractor, materialmen, or manufacturer whose guaranty or warranty is called for. The CMR further agrees that:

6.5.3.2.1 Jointly and Severally Liable. The CMR is jointly and severally liable with such subcontractors, materialmen, or manufacturers; and

6.5.3.2.2 Agents of the CMR. The said subcontractors, materialmen, or manufacturers are agents of the CMR for purposes of performance under this article, and the CMR, as principal, ratifies the warranties or guaranties of his aforesaid agents by the filing of the aforesaid instruments with the Board. The CMR as principal is liable for the acts or omissions of his agents.

6.5.3.2.3 Service of notice. Service of notice on the CMR that there has been breach of any warranty or guaranty will be sufficient to invoke the terms of the instrument.

6.5.3.2.4 Bind Subcontractors and Other Entities. The CMR will bind his subcontractor, materialmen, and manufacturers to the terms of this section.

6.5.3.2.5 Warranties no Limitation. The calling for or the furnishing of written warranties shall in no way limit the contractual obligation of the CMR to correct the work as set forth in this Part. The remedies stated in this article are in addition to the remedies otherwise available to the Board, do not exclude such other remedies, and are without prejudice to any other remedies.

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PART 6 – FINAL COMPLETION

6.6.1 Final Completion.

6.6.1.1 Final Completion Defined. Final Completion is the completion of all Work, including completion of all Minor Items and Permitted Incomplete Work as defined in Section 6, Part 1. Final Completion shall be evidenced by the Design Professional's Certificate of Final Completion (Section 7 Forms).

6.6.1.2 When Final Completion Required. Final Completion shall be obtained not later than thirty (30) days after the last stated completion dates of any Permitted Incomplete Work or Minor Items. The Design Professional's Certificate of Final Completion shall not be issued until all Work is completed.

6.6.2 RESERVED.

6.6.3 Effect of Achieving Final Completion. Upon the date when Final Completion is achieved and the Design Professional's Certificate of Final Completion is issued, the following matters are conclusively determined

6.6.3.1 Project Completion. The project and the Work are complete.

6.6.3.2 Payment for Final Completion. All amounts withheld from Payment for Material Completion and not credited to the Board, as set forth in Section 6 Part 4, are payable upon receipt of a final pay request from the CMR.

6.6.4 Conducting the Inspection for Final Completion. In the event that Permitted Incomplete Work remains after the Interim Inspection for Punch list Completion, at such time when all such Permitted Incomplete Work has been completed or scheduled for completion, the CMR shall call for and the Design Professional shall schedule the final Inspection with the Board and CMR. The Design Professional shall conduct the Inspection for Final Completion and shall confirm that all Permitted Incomplete and other Work have been completed. Upon successful completion of the inspection, the Design Professional shall issue the Certificate of Final Completion. Final Payment, including any remaining funds withheld may, upon an application for payment, be paid to the CMR. Any Final Documents or updates to Final Documents not yet submitted must be submitted with the call for Final Inspection. In the event any item of Permitted Incomplete Work is determined to be incomplete and the date for its completion has passed, the Board may give the fourteen (14) day notice of failure to complete the Work set forth in Section 6.2.3.

6.6.5 Effect of Failure to Achieve Final Completion. Should Final Completion not be achieved within the time specified, the Board will issue to the CMR a fourteen (14) day notice as a final warning to complete the Work. If Final Completion is not achieved by the end of the 14th day from the date of the Notice, the following matters are conclusively determined, subject to any request for extension of time as set forth in Section 6.3.6.3.

6.6.5.1 Breach of Covenant of Time. As time is of the essence in the completion of the Work, the CMR is in breach of the covenant of time and is subject to default.

6.6.6 Final Payment. Final Payment shall be due thirty (30) days after receipt by the Board of the application for payment upon achievement and certification of Final Completion and all terms and conditions of the Contract have been met, provided that Final Documents shall have been submitted. Payment shall be made by a check payable jointly to the CMR and surety and shall be mailed to the surety. Board shall process the Final Payment expeditiously as possible in accordance with the certification of the Design Professional, but interest shall not accrue until thirty (30) days have elapsed from receipt, unless error is found in the application or supporting documents.

6.6.6.1 Certification of CMR. The CMR shall certify, over his own signature, that the Work provided for by the Contract Documents has been completed under the terms and conditions thereof, and that the entire balance of the contract is due and payable.

6.6.6.2 Supporting Documentation.

6.6.6.2.1 Financial Data. The CMR shall submit evidence satisfactory to the Design Professional that all payrolls, material bills, and other indebtedness connected with the work have been paid.

6.6.6.2.2 Affidavits and Bonds. The CMR shall attach copies of the affidavits and bonds set forth in Section 6.4.2.2.1, execute the payment certification, and forward it directly to the Design Professional.

6.6.7 Effect of Final Payment and Release of Claims. Acceptance of Final Payment for Final Completion by the CMR shall operate as settlement, waiver, release, discharge and payment in full of all claims against Board of any nature arising out of the Project.

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SECTION 7 – CONTRACT FORMS

FORMS INCLUDED:

Performance Bond
Payment Bond
Non-Influence Affidavit
Statutory Affidavit
Georgia Security and Immigration Compliance Act Affidavit
Certificate of Insurance
Required Endorsement for CGL Policy
Bond to Discharge Claim
Subcontractor Early Retainage Release Certificate
Affidavit, Interim Waiver and Conditional Release of Liens and Claims
Subcontractor Affidavit, Interim Waiver and Conditional Release of Liens and Claims
Affidavit, Final Waiver and Release of Liens and Claims
Subcontractor Affidavit, Final Waiver and Release of Liens and Claims

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Project No. _____

PERFORMANCE BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ as principal (hereinafter referred to
(Legal Name and Address of the CMR)
as ("CMR"), and _____ as surety (hereinafter referred to
(Legal Title and Address of Surety)
as "Surety"), are held and firmly bound unto the Board of Public Education for the City of Savannah and the County of Chatham, Georgia, as Obligee (hereinafter referred to as "Board" or "Owner"), in the amount of _____ DOLLARS (\$ _____), to which payment CMR and Surety bind Themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden CMR has entered into a contract with the Board bearing date of _____ for: _____
(Here insert Name of Project)

in accordance with drawings and specifications prepared by: _____,
(Full Name and Title)
which said contract is incorporated herein by reference and made a part hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the CMR shall promptly and faithfully perform and comply with the terms and conditions of said contract; and shall indemnify and save harmless the Board against and from all cost, expenses, damages, injury or loss to which said Board may be subjected by reason of any wrongdoing, including patent infringement, misconduct, want of care or skill, default or failure of performance on the part of said CMR, his agents, subcontractors or employees, in the execution or performance of said contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

- (1) The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work to be performed thereunder, or the specifications or drawings accompanying same, or the exercise of the Board's right to do work pursuant to the Contract Documents shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the Work or to the specifications or drawings. In addition, the Surety to this bond, for value received, hereby agrees to the provisions of the Contract Documents for increases in the penal amount of this bond and waives notice from the Board of any such changes.
- (2) If pursuant to the Contract Documents the CMR shall be declared in default by the Board under the aforesaid Contract, the Surety shall promptly perform this bond agreement in accordance with its terms and conditions. It shall be the duty of the Surety to give an unequivocal notice in writing to the Board, within twenty-five (25) days after receipt of a declaration of default, of the Surety's election to either remedy the default or defaults promptly or to perform the Contract promptly, time being of the essence. In said notice of election, the Surety shall indicate the date on which the remedy or performance will commence, and it shall then be the duty of the Surety to give prompt notice in writing to the Board immediately upon completion of (a) the remedy and/or correction of each default, (b) the remedy and/or correction or each item of condemned work, (c) the furnishing of each omitted item of work, and (d) the performance of the contract. The Surety shall not assert its CMR as justification for its failure to give notice of election or for its failure to promptly remedy the default or defaults or perform the Contract.
- (3) Supplementary to and in addition to the foregoing, whenever the Board shall notify the Surety that the Board has notice that the CMR has failed to pay any subcontractor, materialman, or laborer for labor or materials certified by the CMR as having been paid for by the CMR in accordance with said Contract, which said laborer or materials have been included in a periodical estimate and certified by the Design Professional for payment and paid for by the Board, the Surety shall, within twenty (20) days of receipt of such notice, cause to be paid any unpaid amounts for such labor and materials.

- (4) It is expressly agreed by the CMR and the Surety that the Board, if he desires to do so, is at liberty to make inquiries at any time of subcontractors, laborers, materialmen, or other parties concerning the status of payments for labor, materials, or services furnished in the prosecution of the work.
- (5) No right of action shall accrue on this bond to or for the use of any person or corporation other than the Board named herein or the legal successors of the Board .
- (6) For the purposes of this bond, the name and address of the Authorized State of Georgia Licensed Agent to whom correspondence and telecommunications may be addressed and/or with whom business concerning this bond may be conducted will be as follows:

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

TELEPHONE _____

- (7) Further, this bond shall be the Performance Bond furnished under O.C.G.A. Title 36 Chapter 91 and shall be subject to increase in the penal amount of the bond pursuant to such statutes.

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

ATTEST (*) (NAME OF CMR)

Secretary

By _____
President

(SURETY) (*) (*)

(TITLE)

(*) Please apply seal of Corporation over Secretary's Signature.

(*) (*) Please apply seal of Surety and arrange for countersignature by a "Resident Georgia Agent" of Surety in order to comply with surety regulations of Georgia. Kindly show title of the aforesaid agent as "Resident Georgia Agent."

(*) Attach Power of Attorney

Project No. _____

PAYMENT BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ as Principal (hereinafter referred to as the
(Legal Title and Address of the CMR)

"CMR") and _____ as Surety (hereinafter referred to as "Surety",
(Legal Name and Address of the Surety)

are held and firmly bound unto the Board of Public Education for the City of Savannah and the County of Chatham, as Obligee (hereinafter referred to as "Board ") for the use and benefit of claimants defined, hereinafter in the amount of:

_____ DOLLARS (\$ _____)

to which payment CMR and Surety bind themselves, their heirs, executors, administrators, successors and assigns jointly and severally, firmly by these presents.

WHEREAS, the above bounden CMR has entered into a contract with Board dated _____ for
(Insert Name of Work) in accordance with the drawings and

specifications prepared by: _____, which contract is incorporated herein
(Here insert Full Name and Title)

by reference and made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the CMR shall promptly make payment to all claimants as hereinafter defined, for all labor and materials supplied in the prosecution of the work provided for in said Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

- (1) The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work to be performed thereunder, or the specifications or drawings accompanying same, or the exercise of the Board's right to do work pursuant to the Contract Documents shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the Work or to the specifications or drawings. In addition, the Surety to this bond, for value received, hereby agrees to the provisions of the Contract Documents for increases in the penal amount of this bond and waives notice from the Board of any such changes.
- (2) A claimant is defined as any subcontractor and any person supplying labor, materials, machinery, or equipment in the prosecution of the work provided for in said contract.
- (3) Every person entitled to the protection hereunder and who has not been paid in full for labor or materials furnished in the prosecution of the work referred to in said bond before the expiration of a period of ninety (90) days after the day on which the last of the labor was done or performed by him, or materials or equipment or machinery was furnished or supplied by him for which claim is made, shall have the right to sue on such payment bond for the amount, or the balance thereof, unpaid at the time of the commencement of such action and to prosecute such action to final execution and judgment for the sum or sums due him, provided, however, that any person having direct contractual relationship with a subcontractor, but no contractual relationship express or implied with the CMR furnishing said payment bond shall have (a) given written notice to said CMR within ninety (90) days from the day on which such person did or performed the last of the labor, or furnished the last of the materials or machinery or equipment for which such claim is made stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished or supplied or for whom the labor was performed or done; and (b) if the CMR has filed a Notice of Commencement in accordance with any requirements of Georgia Law and the Contract Documents given to said contractor a written Notice to Contractor within thirty (30) days from the filing of the Notice of Commencement or thirty (30) days following the first delivery of labor, materials, machinery or equipment, whichever is later, setting forth:
 - A) The name, address, and telephone number of the person providing labor, material, machinery, or equipment;
 - B) The name and address of each person at whose instance the labor, material, machinery or equipment is being furnished; and
 - C) The name and the location of the public work; and
 - D) A description of the labor, material, machinery, or equipment being provided and, if known, the contract price or anticipated value of the labor, material, machinery, or equipment to be provided or the amount claimed to be due, if any.

It is provided further that nothing contained herein shall limit the right of action to said ninety (90)-day period. Notice may be served by the depositing of a notice, registered mail, postage paid, duly addressed to the CMR at any place he maintains an office or conducts his business, or his residence, in any post office or branch post office or any letter box under the control of the Post Office Department or notice may be served in any manner in which the sheriffs of Georgia are authorized by law to serve summons or process. Every suit instituted under this section shall be brought in the name of the claimant without Board being made a party thereof. The official who has custody of said bond is authorized and directed to furnish, to any person making application thereof who submits an affidavit that he has supplied labor or materials for such work and payment therefore has not been made, or that he is being sued on any such bond, a copy of such bond and the contract for which it was given, certified, by the official who has custody of said bond and contract shall be admitted in evidence without further proof. Applicants shall pay for such certified statements and such fees as the official fixes to cover the cost of preparation thereof, but in no case shall the fixed fee exceed the fees that the clerks of the superior courts are permitted to charge for similar copies.

- (4) No action can be instituted on this bond after one year from the date of the final completion of the contract as provided by O.C.G.A. § 36-91-95.
- (5) Further, this bond shall be the Payment Bond furnished in compliance with O.C.G.A. Chapter 36 Title 91 and shall be subject to increase in the penal amount of the bond pursuant to such statutes and the Contract Documents.
- (6) For the purposes of this bond, the name and address of the Authorized State of Georgia Licensed Agent to whom correspondence and telecommunications may be addressed and/or with whom business concerning this bond may be conducted will be as follows:

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

TELEPHONE _____

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

IN THE PRESENCE OF:

WITNESS

CMR (SEAL)

NAME _____ TITLE _____

WITNESS

SURETY (SEAL)

NAME _____ TITLE _____
Resident Georgia Agent*

(*) Attach Power of Attorney

NON-INFLUENCE AFFIDAVIT – CONSTRUCTION
OCGA 36-91-21

Excerpt from Georgia Laws
OCGA Section 36-91-21

(d) Whenever a public works construction contract for any governmental entity subject to the requirements of this chapter is to be let out by competitive sealed bid or proposal, no person, by himself or herself or otherwise, shall prevent or attempt to prevent competition in such bidding or proposals by any means whatever. No person who desires to procure such work for himself or herself or for another shall prevent or endeavor to prevent anyone from making a bid or proposal therefore by any means whatever, nor shall such person so desiring the work cause or induce another to withdraw a bid or proposal for the work.

(e) Before commencing the work, any person who procures such public work by bidding or proposal shall make an oath in writing that he or she has not directly or indirectly violated subsection (d) of this Code section. The oath shall be filed by the officer whose duty it is to make the payment. If the contractor is a partnership, all of the partners and any officer, agent, or other person who may have represented or acted for them in bidding for or procuring the contract shall also make the oath. If the contractor is a corporation, all officers, agents, or other persons who may have acted for or represented the corporation in bidding for or procuring the contract shall make the oath. If such oath is false, the contract shall be void, and all sums paid by the governmental entity on the contract may be recovered by appropriate action.

STATE OF GEORGIA
COUNTY OF _____

I do solemnly swear on my oath that, as to the Contract dated _____, 20____, between _____ and The Board of Public Education for the City of Savannah and the County of Chatham, Georgia, I have not directly or indirectly influenced or the attempted exertion of any influence on behalf of the firm on behalf of which this affidavit is made, in any way, manner, or form in the purchase of materials, equipment, or other items involved in construction, manufacture, or employment of labor under the aforesaid Contract by or on any employee, officer, or agent of the Board, or any person connected with SCCPSS in any way whatsoever and I have not directly or indirectly violated subsection (d) of OCGA 36-91-21.

This _____ day of _____, 20_____.

_____(L.S.)
Signature

Title

Firm

Sworn to and subscribed before me this _____ day of _____, 2008

Notary Public

My Commission expires _____

This _____ day of _____, 20_____.

STATUTORY AFFIDAVIT

STATE OF GEORGIA;
COUNTY OF _____:

FROM: _____
(CMR)

TO: The Board of Public Education for the City of Savannah and the County of Chatham

Re: Contract entered into the ___ day of _____, 20___, between the above-mentioned parties for the construction of Project No. _____ located at _____

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned hereby certifies that all work required under the above Contract has been performed in accordance with the terms thereof, that all materialmen, Trade Contractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character [including disputed claims or any claims to which the CMR has or will assert any defense] arising out of the performance of the Contract that have not been paid and satisfied in full except as listed herein below:

[Instructions to CMR-ENTER THE WORD "NONE" OR LIST THE NAMES OF CLAIMANTS]

2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, Trade Contractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description that might constitute a lien upon the property of the Board .

3. The undersigned makes this affidavit for the purpose of receiving final payment in full settlement of all claims against the Board arising under or by virtue of the contract, and acceptance of such payment is acknowledged as a release of the Board from any and all claims arising under or by virtue of the contract.

This _____ day of _____, 20_____.

_____(L.S.)
Signature

Title

Firm

Personally before me, the undersigned authority, appeared _____, who is known
(NAME OF PERSON SIGNING AFFIDAVIT)

to me to be an official of the firm of _____ who, after being duly sworn, stated on his
(NAME OF CMR)

oath that he had read the above statement and that the same is true and correct.

Notary Public

My commission expires _____

This _____ day of _____, 20_____.

Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of Savannah Chatham County Public School System (SCCPSS) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A. § 13-10-91(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

Federal Work Authorization User Identification Number

Date of Authorization

Name of Contractor

Name of Project

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct. Executed on _____, 201_ in _____ (city), _____ and (state).

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 201_

NOTARY PUBLIC

My Commission Expires: _____

Subcontractor Affidavit under O.C.G.A. § 13-10-91(b)(3)

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (name of contractor) on behalf of (name of public employer) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned subcontractor will continue to use the federal work authorization program throughout the contract period and the undersigned subcontractor will contract for the physical performance of services in satisfaction of such contract only with sub-subcontractors who present an affidavit to the subcontractor with the information required by O.C.G.A. § 13-10-91(b). Additionally, the undersigned subcontractor will forward notice of the receipt of an affidavit from a sub-subcontractor to the contractor within five business days of receipt. If the undersigned subcontractor receives notice that a sub-subcontractor has received an affidavit from any other contracted sub-subcontractor, the undersigned subcontractor must forward, within five business days of receipt, a copy of the notice to the contractor. Subcontractor hereby attests that its federal work authorization user identification number and date of authorization are as follows

Federal Work Authorization User Identification Number

Date of Authorization

Name of Subcontractor

Name of Project

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct. Executed on _____, 201__ in _____(city), _____ and (state).

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 201__

NOTARY PUBLIC

My Commission Expires: _____

Sub-subcontractor Affidavit under O.C.G.A. § 13-10-91(b)(4)

By executing this affidavit, the undersigned sub-subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract for (name of subcontractor or sub-subcontractor with whom such sub-subcontractor has privity of contract) and (name of contractor) on behalf of (name of public employer) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned sub-subcontractor will continue to use the federal work authorization program throughout the contract period and the undersigned sub-subcontractor will contract for the physical performance of services in satisfaction of such contract only with sub-subcontractors who present an affidavit to the sub-subcontractor with the information required by O.C.G.A. § 13-10-91(b). The undersigned sub-subcontractor shall submit, at the time of such contract, this affidavit to (name of subcontractor or sub-subcontractor with whom sub-subcontractor has privity of contract). Additionally the undersigned sub-subcontractor will forward notice of receipt of any affidavit from a sub-subcontractor to (name of subcontractor or sub-subcontractor with whom sub-subcontractor has privity of contract). Sub-subcontractor hereby attests that its federal work authorization user identification number and date of authorization are as follows

Federal Work Authorization User Identification Number

Date of Authorization

Name of Sub-subcontractor

Name of Project

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct. Executed on _____, 201__ in _____(city), _____ and (state).

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 201__

NOTARY PUBLIC

My Commission Expires: _____

Certificate of Insurance

Name, Address and Telephone Number of Producing Agent	PROJECT NO.:
	PROJECT NAME:
Name and Address of Insured Contractor (CMR)	Certificate Holder(Board): Board of Public Education for the City of Savannah and the County of Chatham 208 Bull Street, Savannah, GA 31401

Type of Insurance	Policy No.	Company Affording Coverage	Policy Expiration Date	Limits
Commercial General Liability(2002 or 2003 ISO Occurrence Form or its equivalent); Includes XCU Coverage				General Aggregate \$2,000,000 (per project) Products-Co./Op Agg \$1,000,000 Personal & Adv injury \$1,000,000 Contractual \$1,000,000 Each Occurrence \$1,000,000
Commercial Business Automobile Liability Including, but not limited to, owned, hired and non-owned autos				Combined Single Limit \$1,000,000 Or Bodily Injury \$1,000,000 (per person) Property Damage \$1,000,000
Workers Compensation The Proprietor/Partners/ Executive Officers are included as required				W C Statutory Limits
Employers' Liability				Each Accident \$1,000,000 Disease - Policy Limit \$1,000,000 Disease- Ea. Employee \$1,000,000
Commercial Umbrella Liability *(Aggregate minimum may be reduced to \$4 million for contract sums less than \$5 million)				<u>Each Occurrence \$2,000,000</u> <i>For Project Contract Sum Under \$5,000,000:</i> Aggregate \$4,000,000 <i>For Project Contract Sum \$5M and above:</i> Aggregate \$10,000,000
Builders' Risk written on 1991 Cause of Loss-Special Form or its equivalent(See endorsement below) <p align="center">OR</p> Installation Floater (for other than new construction)				Policy Amount \$ _____ (100% of Contract Sum)

The Undersigned has reviewed the insurance coverages required by the Contract Documents for the project referenced above and makes the following certifications, which shall serve to bind the various insurance carriers to the coverages as required by the Contract Documents:

Such insurance as is herein certified (i) applies to all in connection with the work required by the provisions of the documents forming the contract, (ii) applies whether or not the contract documents between the insured contractor and the Board have been executed, (iii) is written in accordance with the company's regular policies and endorsements, subject to the company's applicable manuals or rules and rates in effect, as modified by this certificate and the insurance article of the contract, (iv) have been issued to the insured named above, and (v) are in force at this time.

With the exception of the Workers Compensation policy, the Officers, Members, Agents, & Employees of the Board are included as additional insureds as their interests may appear.

The Builders' Risk policy has been endorsed as follows: "The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy: (i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; and (ii) Partial or complete occupancy by Board ; and (iii) Performance of work in connection with construction operations insured by the Board, by agents or lessees or other contractors of Board, or by contractors or the lessee of the Board ."

Each policy has been endorsed to provide that the policy shall not be canceled, changed, allowed to lapse, or allowed to expire for any reason until thirty (30) days (10 days for non-payment of premium) after Board has received written notice thereof as evidenced by return receipt of registered letter.

Authorized Representative: _____ **Date:** _____
Typed Name: _____

BOND TO DISCHARGE CLAIM

WHEREAS, _____ (hereinafter referred to as
"Claimant") has filed a claim against _____ (the CMR,
hereinafter referred to as "Principal") on the following contract:

WHEREAS, the undersigned Principal and Surety dispute the Claimant's entitlement to all or part of the
claim and expressly reserve all rights and defenses available at law in connection therewith;

WHEREAS, _____ as Principal and
_____ as Surety, desire to continue to receiving
payments from the Board for work done on the above referenced project,

NOW THEREFORE, in consideration of these premises, the undersigned Principal and Surety do hold
themselves

firmly bond unto _____ as Claimant, in the total amount of
_____ dollars (\$_____), representing double the
amount of the claim.

The condition of this bond is such that should the undersigned Principal or Surety pay to the Claimant the
sum that may be found to be due to the Claimant upon the trial of any action that may be filed by said
Claimant, or if Principal or Surety pay to the Claimant a sum agreeable to Claimant and Claimant accepts
such payment, then this Bond shall be void; otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the said Principal and Surety have set their hands and seals this ____ day of
_____, 20__.

ATTEST (Seal)

Name of Principal

Secretary (Note 1)

by: _____
President

(Seal)

Name of Surety (Note 2)

by: _____
Resident Georgia Agent*

Note 1. Please apply seal of Corporation over Secretary's Signature

Note 2. Please apply seal of Surety and arrange for countersignature by a "Resident Georgia Agent" of Surety in order to comply with surety regulations of Georgia.

(*) Attach Power of Attorney

SUBCONTRACTOR EARLY RETAINAGE RELEASE CERTIFICATE

(To be Originated by Subcontractor)

TO: Board of Public Education for the City of Savannah and the County of Chatham

RE: Project Name and Number: _____

Certificate Regarding Subcontractor's Completed Work and Retainage Release

1. This is to certify that our Subcontractor's work is one hundred percent complete for _____ (Identify subcontract scope, contract document, etc.). The subcontractor's retainage is due in accordance with the Contract Documents. The total amount of retainage now due is \$_____.

2. The Subcontractor hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all materialmen, subcontractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character (including disputed claims or any claims to which the subcontractor has or will assert any defense) arising out of the performance of the contract which have not been paid and satisfied in full except as listed herein below, which exceptions apply only to the release in Paragraph 5, below:

[Enter: "None" or List or Make Reference & Attach Exhibit A.]

3. The Subcontractor further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a claim or lien upon the property of the Board.

4. The Subcontractor further certifies he has no knowledge of the exertion of any influence or the attempted exertion of any influence on the firm on behalf of which this Certificate is made, in any way, manner, or form in the purchase of materials, equipment, or other items involved in construction, manufacture, or employment of labor under the aforesaid contract by any employee, officer, or agent of the Board, or any person connected with the State Government of Georgia in any way whatsoever.

5. The Subcontractor has has not (Check One) received final payment in full settlement of all claims against the Board and CMR arising under or by virtue the contract. Acceptance of such payment is acknowledged as a release of the Board and CMR from any and all claims arising under or by virtue of the contract except as set forth in Paragraph 2 above.

6. Payments pursuant to this certificate shall in no way diminish, change, alter or affect the rights of the Board under the contract documents.

SUBCONTRACTOR:

By: _____

Date:

CMR:

By: _____

Date:

DESIGN PROFESSIONAL:

By: _____

Date:

NOTICE: BOARD MUST RECEIVE A COPY WITH ALL ORIGINAL SIGNATURES.

**AFFIDAVIT, INTERIM WAIVER AND CONDITIONAL RELEASE
OF LIENS AND CLAIMS**

Project Description: _____ ("Project")

Contract Description: _____ ("Contract")

Board : _____ ("Board ")

The undersigned, _____ ("Company") for, in consideration of, and conditioned on receipt of the payment of the sum of _____ dollars (\$_____), to be paid to it upon return of this executed document for labor, materials, equipment, services and/or other work supplied to and/or performed in connection with the above-referenced Contract or Project, Company hereby certifies, through and including _____, 200_ (the "Effective Date") as follows:

1. The undersigned has received payment in full for all labor supplied, materials furnished to and for all other work performed in connection with the Contract and/or the Project through and including the Effective Date and hereby represents and warrants that as of that date there are no outstanding claims by it or by any of its subcontractors, suppliers, laborers or materialmen ("Subcontractors") in connection with the Contract and/or Project except for those set forth in the attached Exhibit A and except for retainage. The undersigned has not and will not assign any claim for payment or right to file or perfect a lien against the Project. The undersigned has the right, power and authority to execute this Affidavit, Interim Waiver and Release of Liens and Claims.

2. In consideration of and conditioned on receipt of the above-mentioned payment, the undersigned does hereby waive, release and quit claim, in favor of the Board of the Project, any future Board of the Project, each and every party acquiring title to and/or making a loan on the Project, guarantor, trustee, beneficiary and any other party having an interest in the Project and any and all of their successors and assigns, (hereafter collectively referred to as the "Released Entities"), all rights that presently exist or hereafter may accrue to the undersigned to assert a lien or other encumbrance upon the land and improvements comprising the Project except for those set forth in the attached Exhibit A and except for retainage.

3. The undersigned warrants that all Subcontractors employed by it and from which it has acquired materials in furtherance of the Contract and/or Project and any lien or bond claimant relating to the undersigned's Contract have been paid in full, in accordance with their respective subcontracts, and that none of such Subcontractors or claimants have any claim, demand or lien against the Project or Released Entities. Other than security interests that may arise as a matter of law, no security interest has been given or executed by the undersigned for or in connection with any materials, appliances, machinery, fixtures or furnishings placed upon or installed at the Project.

4. The undersigned does hereby forever release, waive, and discharge the Project and Released Entities from (and quitclaim to them) any and all known liens, rights to lien, claims, causes of action, rights of action, debts, demands, dues, damages, rights, actions, suits, fees (including attorney's and consultant's fees), costs, accounts, bonds, bills, covenants, contracts, controversies, agreements, promises, variances, executions, liabilities, losses and judgment(s), whether past, present or future, arising in law or in equity of whatever nature (whether in contract, quasi-contract, tort or otherwise) (collectively referred to as "Claims"), on, against, related to, arising out of, connected with, and/or on account of the above-described Contract or Project, which the undersigned and/or its successors and/or assignees ever had or now have against the Released Entities or Project except for those set forth in the attached Exhibit A and except for retainage.

5. The undersigned covenants and agrees that, as an express condition precedent to Board making payment hereunder, all Subcontractors and those persons and entities which contracted with undersigned's Subcontractors for the supply of labor, materials, equipment, supplies and any other work whatsoever on or for the Project or Contract, either directly or indirectly, have been paid therefor in full in accordance with their respective subcontracts, and the undersigned has obtained and provided to Board a Waiver and Release, effective through the Effective Date in a form reasonably acceptable to the Released Parties from all such Subcontractors, persons and entities, and none of such Subcontractors, persons and entities have any Claims,

on, against, related to, arising out of, connected with, and/or on account of the above-described Contract or Project or Released Parties except for those set forth in the attached Exhibit A and except for retainage. The undersigned hereby agrees that in the event that any Subcontractors, person(s) or entity(ies) assert any such Claims against the Project or Released Parties except for those set forth in the attached Exhibit A and except for retainage, then it will defend, indemnify and hold the Released Entities and the Project harmless from them (including, but not limited to, bonding off liens and bearing the cost thereof, at Board's request) as well as from any damages, fees (including attorney's and consultant's fees), costs, settlements and judgment(s), directly or indirectly relating thereto or arising therefrom unless such Claim arises from Board's failure to make payments as and when due under the Contract.

IN WITNESS WHEREOF, this Affidavit, Interim Waiver and Release of Liens and Claims has been executed on this __ day of _____, 200__.

Name of Company: _____
By: _____ [SEAL]
Title: _____ and
authorized agent.

Subscribed and sworn to me before the undersigned, a Notary Public for the County of _____, State of _____, this ____ day of _____, ____.

Notary Public

My Commission Expires:

**SUBCONTRACTOR AFFIDAVIT, INTERIM WAIVER AND
CONDITIONAL RELEASE OF LIENS AND CLAIMS**

Project Description: _____ ("Project")
Description

Contract _____ ("Contract")

Board : _____ ("Board ")

Contractor: _____ ("Contractor")

Original Contract Amount:	\$ _____
Change Orders/Approved	
Additional Services	\$ _____
Total	\$ _____
Previous Payments:	\$ _____
Current Payment:	\$ _____
Contract Balance:	\$ _____

The undersigned, _____ ("Company") for, in consideration of, and conditioned on receipt of the payment of the sum of _____ dollars (\$ _____), to be paid to it upon return of this executed document for labor ("Labor") and/or all materials, equipment, services and/or other work ("Materials/Services") supplied to and/or performed in connection with the above-referenced Contract or Project, Company hereby agrees and certifies, through and including _____, 200__ the "Effective Date") as follows:

1. The undersigned has received payment in full for all Labor supplied, Materials/Services furnished to and for all other work performed in connection with the Contract and/or the Project through and including the Effective Date and hereby represents and warrants that as of that date there are no outstanding Claims by it or by any of its subcontractors, suppliers, laborers or materialmen ("Sub-subcontractors") in connection with the Contract and/or Project except for those set forth in the attached Exhibit A and except for retainage. The undersigned has not and will not assign any Claim, as defined herein. The undersigned has the right, power and authority to execute this Subcontractor Affidavit, Interim Waiver and Release of Liens and Claims ("Waiver and Release").

2. The undersigned warrants that all Sub-subcontractors employed by it and from which it has acquired Labor and Materials/Services in furtherance of the Contract and/or Project and any lien or bond claimant relating to the undersigned's Contract have been paid in full in accordance with their respective Subcontracts and that none of such Sub-subcontractors or claimants have any claim, demand or lien against the Project or Released Entities, as defined below. Other than security interests that may arise as a matter of law, no security interest has been given or executed by the undersigned for or in connection with any Materials/Services, including but not limited to appliances, machinery, fixtures or furnishings placed upon or installed at the Project.

3. In consideration of and conditioned on the receipt of the above-mentioned payment, the undersigned does hereby quit claim to Contractor and forever release, waive, and discharge any and all liens, rights to lien, claims, causes of action, rights of action, debts, demands, dues, damages, rights, actions, suits, fees (including attorney's and consultant's fees), costs, accounts, bonds, bills, covenants, contracts, controversies, agreements, promises, variances, executions, liabilities, losses and judgment(s), whether past or present, arising in law or in equity of whatever nature (whether in contract, quasi-contract, tort or otherwise) (collectively referred to herein as "Claims"), on, against, related to, arising out of, connected with, and/or on account of the above-described Contract and/or Project, which the undersigned and/or its successors and/or assignees ever had or now have against the Project or Contractor, Board, any future Board of the Project, each and every party having or acquiring title to and/or making a loan on the Project, guarantor, trustee, beneficiary, and any other party having an interest in the Project and any and all of their successors and assigns (herein collectively referred to as the "Released Entities") except for those set forth in the attached Exhibit A and except for retainage.

4. The undersigned covenants and agrees that, as an express condition precedent to Contractor making payment hereunder, all Sub-subcontractors and those persons and entities which contracted with undersigned's

Sub-subcontractors for the supply of Labor, Materials/Services and any other work whatsoever on or for the Project or Contract, either directly or indirectly, have been paid therefor in full, and the undersigned has obtained and provided to Contractor a Waiver and Release, effective through the Effective Date in a form reasonably acceptable to the Released Parties from all such Sub-subcontractors, persons and entities, and none of such Sub-subcontractors, persons and entities have any Claims on, against, related to, arising out of, connected with, and/or on account of the above-described Contract or Project or Released Parties except for those set forth in the attached Exhibit A and except for retainage. The undersigned hereby agrees that in the event that any Sub-subcontractors, person(s) or entity(ies) assert any such Claims against the Project or Released Parties except for those set forth in the attached Exhibit A and except for retainage, then it will defend, indemnify and hold the Released Entities and the Project harmless from them (including, but not limited to, bonding off liens and bearing the cost thereof, at its own initiative or Contractor's request) as well as from any damages, fees (including attorney's and consultant's fees), costs, settlements and judgment(s), directly or indirectly relating thereto or arising therefrom unless such Claim arises from Board's failure to make payments as and when due under its contract with the Contractor.

IN WITNESS WHEREOF, this Affidavit, Interim Waiver and Release of Liens and Claims has been executed on this __ day of _____, 200_.

Name of Company: _____
By: _____ [SEAL]

Title: _____ and authorized agent.

Subscribed and sworn to me before the undersigned, a Notary Public for the County of _____, State of _____, this ____ day of _____, 200_.

Notary Public

My Commission Expires: _____

**AFFIDAVIT, FINAL WAIVER AND RELEASE OF
LIENS AND CLAIMS**

Project Description: _____ ("Project")

Contract _____ ("Contract")

Board : _____ ("Board ")

The undersigned, _____, ("Company") for and in consideration of the final payment sum of _____ dollars (\$_____) to be paid to it upon return of this executed document for labor supplied and/or materials furnished to and with regard to the above-referenced Project pursuant to the Contract, hereby agrees and certifies as follows:

1. The undersigned has received payment in full for all labor supplied, materials furnished to and for all other work performed in connection with the Contract and/or the Project and hereby represents and warrants that there are no outstanding claims by it or by any of its subcontractors, suppliers, laborers or materialmen ("Subcontractors"), if any, in connection with the Contract and/or Project. The undersigned has not and will not assign any claim for payment or right to file or perfect a lien against the Project. The undersigned has the right, power and authority to execute this Affidavit, Final Waiver and Release of Liens and Claims.

2. In consideration of the above-mentioned payment, the undersigned does hereby waive, release and quit claim, in favor of the Board of the Project, any future Board of the Project, each and every party acquiring title to and/or making a loan on the Project, guarantor, trustee, beneficiary and any other party having an interest in the Project and any and all of their successors and assigns, (hereafter collectively referred to as the "Released Entities"), all rights that presently exist or hereafter may accrue to the undersigned to assert a lien or other encumbrance upon the land and improvements comprising the Project.

3. The undersigned warrants that all Subcontractors employed by it and from which it has acquired materials in furtherance of the Contract and/or Project and any lien or bond claimant relating to the undersigned's Contract have been paid in full, in accordance with their respective subcontracts, and that none of such Subcontractors or claimants have any claim, demand or lien against the Project or Released Entities. No security interest has been given or executed by the undersigned or remains for or in connection with any materials, appliances, machinery, fixtures or furnishings placed upon or installed at the Project.

4. The undersigned does hereby forever release, waive, and discharge the Project and Released Entities from (and quitclaim to them) any and all known and unknown liens, rights to lien, claims, causes of action, rights of action, debts, demands, dues, damages, rights, actions, suits, fees (including attorney's and consultant's fees), costs, accounts, bonds, bills, covenants, contracts, controversies, agreements, promises, variances, executions, liabilities, losses and judgment(s), whether past, present or future, arising in law or in equity of whatever nature (whether in contract, quasi-contract, tort or otherwise) (collectively referred to as "Claims"), on, against, related to, arising out of, connected with, and/or on account of the above-described Contract or Project, whether known or unknown and whether presently ascertainable or not, which the undersigned and/or its successors and/or assignees ever had, now have, or ever will have against the Released Entities or Project.

5. The undersigned covenants and agrees that, as an express condition precedent to Board making payment hereunder, all Subcontractors and those persons and entities which contracted with undersigned's Subcontractors for the supply of labor, materials, equipment, supplies and any other work whatsoever on or for the Project or Contract, either directly or indirectly, have been paid therefor in full in accordance with their respective subcontracts, and the undersigned has obtained and provided to Board a Final Waiver and Release, effective through the date of execution of this Waiver and Release, in a form reasonably acceptable to the Released Parties from all such Subcontractors, persons and entities, and none of such Subcontractors, persons and entities have any Claims, on, against, related to, arising out of, connected with, and/or on account of the above-described Contract or Project or Released Parties. The undersigned hereby agrees that in the event that any Subcontractors, person(s) or entity(ies) assert any such Claims against the Project or Released Parties, then it will defend, indemnify and hold the Released Entities and the Project harmless from them (including, but not limited to, bonding off liens and bearing the cost thereof, at Board's request) as well as from any damages, fees

(including attorney's and consultant's fees), costs, settlements and judgment(s), directly or indirectly relating thereto or arising therefrom.

IN WITNESS WHEREOF, this Affidavit, Final Waiver and Release of Liens and Claims has been executed on this __ day of _____, ____.

Name of Company: _____
By: _____ [SEAL]
Title: _____ and authorized agent

Subscribed and sworn to me before the undersigned, a Notary Public for the County of _____, State of _____, this ____ day of _____, ____.

Notary Public

My Commission Expires: _____

**SUBCONTRACTOR AFFIDAVIT, FINAL WAIVER AND
RELEASE OF LIENS AND CLAIMS**

Project Description: _____ ("Project")

Contract _____ ("Contract")

Board : _____ ("Board ")

Contractor: _____ ("Contractor")

The undersigned, _____, ("Company") for and in consideration of the final payment sum of _____ dollars (\$ _____) to be paid to it upon return of this executed document for labor ("Labor") and/or all materials, equipment, services and/or other work ("Materials/Services") supplied to and/or performed in connection with the above-referenced Contract or Project, hereby agrees and certifies as follows:

1. The undersigned has received payment in full for all Labor supplied, Materials/Services furnished to and for all other work performed in connection with the Contract and/or the Project and hereby represents and warrants that there are no outstanding Claims by it or by any of its subcontractors, suppliers, laborers or materialmen ("Sub-subcontractors") in connection with the Contract and/or Project. The undersigned has not and will not assign any Claim, as defined herein. The undersigned has the right, power and authority to execute this Subcontractor Affidavit, Final Waiver and Release of Liens and Claims ("Waiver and Release").
2. The undersigned warrants that all Sub-subcontractors employed by it and from which it has acquired Labor and Materials/Services in furtherance of the Contract and/or Project and any lien or bond claimant relating to the undersigned's Contract have been paid in full, in accordance with their respective subcontracts, and that none of such Sub-subcontractors or claimants have any claim, right, demand or lien against the Project or Released Entities, as defined below. No security interest has been given by the undersigned, or remains for or in connection with any Material including but not limited to, appliances, machinery, fixtures or furnishings placed upon or installed at the Project.
3. In consideration of the above-mentioned payment, the undersigned does hereby quit claim to Contractor and forever release, waive, and discharge any and all known and unknown liens, rights to lien, claims, causes of action, rights of action, debts, demands, dues, damages, rights, actions, suits, fees (including attorney's and consultant's fees), costs, accounts, bonds, bills, covenants, contracts, controversies, agreements, promises, variances, executions, liabilities, losses and judgment(s), whether past, present or future, arising in law or in equity of whatever nature (whether in contract, quasi-contract, tort or otherwise) (collectively referred to herein as "Claims"), on, against, related to, arising out of, connected with, and/or on account of the above-described Contract and/or Project, whether known or unknown and whether presently ascertainable or not, which the undersigned and/or its successors and/or assignees ever had, now have, or ever will have against the Project or Contractor, Board, any future Board of the Project, each and every party having or acquiring title to and/or making a loan on the Project, guarantor, trustee, beneficiary, and any other party having an interest in the Project and any and all of their successors and assigns (herein collectively referred to as the "Released Entities").
4. The undersigned covenants and agrees that, as an express condition precedent to Contractor making payment hereunder, all Sub-subcontractors and those persons and entities which contracted with undersigned's Sub-subcontractors for the supply of Labor, Materials/Services and any other work whatsoever on or for the Project or Contract, either directly or indirectly, have been paid therefore in full, in accordance with their respective subcontracts, and the undersigned has obtained and provided to Contractor a final Waiver and Release, effective through the date of execution of this Waiver and Release, in a form reasonably acceptable to the Released Parties from all such Sub-subcontractors, persons and entities, and none of such Sub-subcontractors, persons

and entities have any Claims on, against, related to, arising out of, connected with, and/or on account of the above-described Contract or Project or Released Parties. The undersigned hereby agrees that in the event that any Sub-subcontractors, person(s) or entity(ies) assert any such Claims against the Project or Released Parties, then it will defend, indemnify and hold the Released Entities and the Project harmless from them (including, but not limited to, bonding off liens and bearing the cost thereof, at Contractor's request) as well as from any damages, fees (including attorney's and consultant's fees), costs, settlements and judgment(s), directly or indirectly relating thereto or arising therefrom.

IN WITNESS WHEREOF, this Affidavit, Final Waiver and Release of Liens and Claims has been executed on this __ day of _____, 200_.

Name of Company: _____
By: _____ [SEAL]
Title: _____ and authorized agent

Subscribed and sworn to me before the undersigned, a Notary Public for the County of _____, State of _____, this ____ day of _____, 20__.

Notary Public

My Commission Expires: _____

SECTION 01 00 00 - SUPPLEMENTARY GENERAL REQUIREMENTS

PART 1 - GENERAL

- A. Anticipated Weather Delay Days: The Contractor shall anticipate the following number weather delay days which shall not be the basis for extensions of time or adjustment to the Contract Sum:
 1.

ANTICIPATED WEATHER DELAY DAYS Savannah, GA	
Month	Number of Days
January	2
February	2
March	2
April	2
May	2
June	4
July	4
August	4
September	3
October	2
November	2
December	2
	Total
	31

- B. Contractor shall be required to comply with the Energy Efficiency and Sustainable Construction Act of 2008 O.C.G.A 50-8-18. The Contractor shall assist in all applicable documentation related to the Energy Efficiency and Sustainable Construction Act of 2008 O.C.G.A 50-8-18.
- C. Renovation will take place while the adjacent building is in use. Any and all contact with Using Agency's students is strictly prohibited. Contact with Building Staff is prohibited without prior authorization for the Using Agency.
- D. The use of all forms of tobacco products on property owned, leased, rented, in the possession of, or in any way used by the Owner or its affiliates is expressly prohibited. "Tobacco Products" is defined as cigarettes, cigars, pipes, all forms of smokeless tobacco, clove cigarettes and nay other smoking devices that use tobacco such as hookahs or simulate the use of tobacco such as electronic cigarettes.
- E. Contractor shall be required to comply with Georgia State Minimum Standard Building Code (International Building Code, 2012 edition) Chapter 17, "Structural Tests and Special Inspections", requirements of which are outlined in the Appendix: 'Special Inspection Package' which immediately follows SECTION 01 40 00 - QUALITY REQUIREMENTS.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 00 00

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Future work.
7. Purchase contracts.
8. Owner-furnished products.
9. Contractor-furnished, Owner-installed products.
10. Access to site.
11. Coordination with occupants.
12. Work restrictions.
13. Specification and drawing conventions.
14. Miscellaneous provisions.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: C21-08 – Savannah Arts Academy Addition & Renovation.

1. Project Location: 500 Washington Avenue, Savannah, Georgia 31405.

B. Owner: Savannah-Chatham County Public School System.

1. Owner's Representative: Dr. Slade Helmly – Project Manager – 912-663-0719.

C. Architect: Cogdell & Mendrala Architects – Eric J. McManus, AIA – 912-234-6318.

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Civil Engineering: Maxwell-Reddick & Associates – Jared Mock.
2. Landscape Architect: Mandel Design, LLC – Tanya Mandel.
3. Structural Engineering: Saussy Engineering – Hunter Saussy.

4. Food Service Design: Camacho & Associates – Glenn Harshmann.
 5. Plumbing Engineering: Duloherly Weeks – Trevor McLean.
 6. Mechanical Engineering: Duloherly Weeks – Trevor McLean.
 7. Electrical Engineering: Duloherly Weeks – Wesley Wommack.
 8. A/V / Acoustical Design: James S. Brawley & Associates – James Brawley
- E. Project Coordinator for Multiple Contracts: Bill Huttinga - Parsons has been appointed by Owner to serve as Project coordinator.
- F. Project Web Site: A project Web site administered by Owner will be used for purposes of managing communication and documents during the construction stage.
1. See Section 01 31 00 "Project Management and Coordination." for requirements for using the Project Web site.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
1. Mechanical & Finishes renovation of Savannah Arts Academy to include theatrical upgrades to Auditorium and new security vestibule. A 14,000 SF new addition is planned in the Northeast corner for a Cafeteria. The existing Cafeteria will be demolished once the new one is on line and parking improvements are planned as well.
- B. Type of Contract:
1. Project will be constructed under a single prime contract.

1.4 PHASED CONSTRUCTION

- A. The Work shall be conducted in 2 phases, with each phase substantially complete as indicated:
1. Phase 1: Work of this phase shall commence and be substantially complete and ready for occupancy .
 2. Phase: The remaining Work shall be substantially complete and ready for occupancy at time of Substantial Completion for the Work.
- B. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates for all phases of the Work.

1.5 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.

- B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
- C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
- D. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.

1.6 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Preceding Work: Owner separate contract(s) for the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
 - 1. : To .
- C. Concurrent Work: Owner separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
 - 1. : To .
- D. Subsequent Work: Owner separate contract(s) for the following additional work to be performed at site following Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
 - 1. : To .

1.7 FUTURE WORK

- A. The Contract Documents include requirements that will allow Owner to carry out future work following completion of this Project; provide for the following future work:

1.8 PURCHASE CONTRACTS

- A. General: Owner has negotiated purchase contracts with suppliers of material and equipment to be incorporated into the Work. Owner will assign these purchase contracts to Contractor. Include costs for purchasing, receiving, handling, storage if required, and installation of material and equipment in the Contract Sum, unless otherwise indicated.
 - 1. Contractor's responsibilities are same as if Contractor had negotiated purchase contracts, including responsibility to renegotiate purchase and to execute final purchasing agreements.
- B. Purchase Contracts Information:

1. : See Section ". "
 - a. Purchase Contract Firm and Representative: .
 - b. Purchase Contract Scope: .
 - c. Purchase Status: .
 - d. Quantity: .
 - e. Other Requirements: .

1.9 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.
- B. Owner-Furnished Products:

1.10 CONTRACTOR-FURNISHED, OWNER-INSTALLED PRODUCTS

- A. Contractor shall furnish products indicated. The Work includes unloading, handling, storing, and protecting Contractor-furnished products as directed and turning them over to Owner at Project closeout.
- B. Contractor-Furnished, Owner-Installed Products:

1.11 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. 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.
- C. Use of Site: Limit use of Project site to indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Limits: Confine construction operations to.
 2. [<Double click to insert sustainable design text for site disturbance.>](#)
 3. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - 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.
- D. 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.

1.12 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day 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 approval of authorities having jurisdiction.
 - 2. Notify Owner not less than **<Insert number>** hours in advance of activities that will affect Owner's operations.

- B. 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 **<Insert number>** hours' notice to Owner of activities that will affect Owner's operations.

- C. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
 - 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
 - 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
 - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.13 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: Limit work in the existing building to normal business working hours of **<Insert time>** a.m. to **<Insert time>** p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: **<Insert restrictions on times permitted for weekend work>**.
 2. Early Morning Hours: **<Insert restrictions or references to regulations by authorities having jurisdiction for restrictions on noisy work>**.
 3. Hours for Utility Shutdowns: **<Insert Owner's restrictions>**.
 4. Hours for **<Insert noisy activity>**: **<Insert Owner's restrictions>**.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify not less than **<Insert number>** days in advance of proposed utility interruptions.
 2. Obtain written permission before proceeding with utility interruptions.
- D. 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 not less than **<Insert number>** days in advance of proposed disruptive operations.
 2. Obtain written permission before proceeding with disruptive operations.
- E. [<Double click to insert sustainable design text for nonsmoking buildings.>](#)
- F. Controlled Substances: Use of tobacco products and other controlled substances is not permitted.
- G. Employee Identification: identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with Owner's requirements for screening of Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.

1.14 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 .
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.15 MISCELLANEOUS PROVISIONS

- A. **<Insert miscellaneous provisions>.**

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Contingency allowances.
- C. Related Requirements:
 - 1. Section 01 22 00 "Unit Prices" for procedures for using unit prices.
 - 2. Section 01 40 00 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.2 SELECTION AND PURCHASE

- A. At Design Professional's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- B. Purchase products and systems selected by Design Professional from the designated supplier.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Contingency Allowance: Include a sitework contingency allowance of \$150,000.00 for use according to Owner's written instructions. Sum amount is to cover additional sitework due to unforeseen conditions that may arise during the course of construction that were not know to, or could have reasonably been known by, the Owner, Engineer, and Contractor including, but not limited to: permitting process(es); demolishing/removal of underground foundations encountered during excavation; utility changes or revisions; field changes required by permitting authorities.
- B. Allowance No. 2: Lump-Sum Allowance: Include a lump sum decorative painting allowance of \$9000.00 for use according to Owner's written instructions. Sum amount is to cover repair of

decorative faux finishes at plaster ceilings in Lobby 1100 of existing building and at Proscenium Arch and adjacent stage door plaster surrounds.

END OF SECTION 01 21 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Section 01 40 00 "Quality Requirements" for general testing and inspecting requirements.

1.2 DEFINITIONS

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

1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- C. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price 1: Installation of 4" Thick Concrete Sidewalk.

1. Description: Install, at the written request of the Owner, additional 4" thick concrete per civil details.
2. Unit of Measurement: Square yard of concrete surface area.
3. Quantity Allowance: Bidders are to include in the Bid the cost of installing **100** square yards of 4" thick concrete sidewalk.
 - a. \$ _____ Per S.Y. \$ _____ ("A" x "B")

B. Unit Price 2: Installation of 6' Black Chain Link Fence.

1. Description: Install, at the written request of the Owner, additional 6 ft high coated chain link fence per civil details as well as the addition of a 4 ft wide swing gate per civil details.
2. Unit of Measurement:
 - a. Linear Footage of additional 6 ft high coated chain link fence
 - b. Per 4 ft wide gate
3. Quantity Allowance:
 - a. Bidders are to include in the Bid the cost of installing **100** linear feet of 6 ft high coated chain link fence.
 - 1) \$ _____ Per L.F. \$ _____ ("A" x "B")
 - b. Bidders are to include in the Bid the cost of installing **2** 4 ft wide swing gates within 6 ft high coated chain link fence.
 - 1) \$ _____ Per Ea. \$ _____ ("A" x "B")

C. Unit Price 3: Installation of sod.

1. Description: Install, at the written request of the Owner, additional sod consistent with landscape details.
2. Unit of Measurement: Square yard of sod.
3. Quantity Allowance: Bidders are to include in the Bid the cost of installing **50** square yards of sod.
 - a. \$ _____ Per S.Y. \$ _____ ("A" x "B")

b.

- D. Unit Price 4: Gypsum Plastering at or below 15' Above Finish Floor
1. Description: At the written request of the Owner, remove deteriorated gypsum plaster and provide Gypsum Plaster as specified at 09 23 00 "Gypsum Plastering"
 2. Unit of Measurement: Square foot.
 - a. Quantity Allowance: Bidders are to include in the Bid the cost of installing **200** square feet of gypsum plaster at or below 15' Above Finish Floor:
 - 1) \$ _____ Per SF. \$ _____ ("A" x "B")
 - b. Quantity Allowance: Bidders are to include in the Bid **200** square feet Gypsum Plastering above 15' Above Finish Floor
 - 1) \$ _____ Per SF. \$ _____ ("A" x "B")
- E. Unit Price 5: Replace Damaged Ceiling Grid
1. Description: At the written request of the Owner, remove damaged ceiling grid and provide Ceiling Grid as specified at 095113 "Acoustical Panel Ceilings & Clouds"
 2. Unit of Measurement: Linear Foot
 3. Quantity Allowance: Bidders are to include in the Bid the cost of installing **400** linear feet of grid.
 - a. \$ _____ Per LF. \$ _____ ("A" x "B")
- F. Unit Price 6: Replace Damaged Wood Trim
1. Description: At the written request of the Owner, remove wood trim and provide Wood Trim as specified at 064600 "Wood Trim".
 2. Unit of Measurement: Linear Foot
 3. Quantity Allowance: 100 linear feet.
 - a. \$ _____ Per Ea. \$ _____ ("A" x "B")
- G. Unit Price 7: Replace Missing Room Signage
1. Description: At the written request of the Owner, provide room signage at rooms missing signage as specified at 101400 "Room Signage".
 2. Unit of Measurement: Each
 3. Quantity Allowance: 20 Signs.
 - a. \$ _____ Per Ea. \$ _____ ("A" x "B")
- H. Unit Price 8: Replace Damaged Markerboards
1. Description: At the written request of the Owner, remove existing damaged markerboards and replace with Markerboards as specified at 101100 "Visual Display Surfaces".
 2. Unit of Measurement: Each 48" x 96" Markerboard
 3. Quantity Allowance: 10 Markerboards.
 - a. \$ _____ Per Ea. \$ _____ ("A" x "B")
- I. Unit Price 9: Replace Damaged Markerboard with Markerboard with Staff Lines
1. Description: At the written request of the Owner, remove existing damaged markerboards and replace with Markerboards with Staff Lines as specified at 101100 "Visual Display Surfaces".
 2. Unit of Measurement: Each 48" x 96" Markerboard
 3. Quantity Allowance: 4 Markerboards.
 - a. \$ _____ Per Ea. \$ _____ ("A" x "B")

- J. Unit Price 10: Provide 1" Wood Fiber Cement Acoustical Panels
 - 1. Description: At the written request of the Owner, provide 1" wood fiber cement acoustical panels, color black, at existing framing in lighting boot above auditorium as specified at Section 09 84 33 - Sound Affecting Wall and Ceiling Units.
 - 2. Unit of Measurement: Square foot (SF).
 - 3. Quantity Allowance 60 square feet
 - a. \$ _____ Per SF. \$ _____ ("A" x "B")

- K. Unit Price 11: Refinish Existing Transparent Finish Doors
 - 1. Description: At the written request of the Owner refinish transparent stained wood doors as specified at Section 09 93 00 - Staining And Transparent Finishing.
 - 2. Unit of Measurement: Per door face.
 - 3. Quantity Allowance (2) faces.
 - \$ _____ Per Ea. \$ _____ ("A" x "B")

- L. Total Of Unit Prices:
 - 1. \$ _____

END OF SECTION 01 22 00

SECTION 01 23 00 – ADDITIVE ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

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

1.3 PROCEDURES

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Western Parking Lot

1. Base Bid: Do not provide parking lot, and associated utilities and landscaping on the Western side of the Existing Building.
2. Alternate: Provide parking lot, and associated utilities and landscaping on the Western side of the Existing Building.

B. Alternate No. 2: Site Fencing

1. Base Bid: Provide Chain Link Fence at all areas indicated on Civil drawings to receive fencing.
2. Alternate: Provide decorative metal fencing at specified fence locations.

C. Alternate No. 3: Terrazzo Base Material

1. Base Bid: Provide Vinyl base in Cafeteria Dining Area.
2. Alternate: Provide Integral Terrazzo Base in Cafeteria Dining Area.

D. Alternate No. 4: Service Yard Enclosure

1. At Service Yard, Base Bid: Provide 8' high chain link fencing with privacy slats as shown on Civil Drawings. At Recycling Enclosure, provide 6' high chain link fencing with privacy slats as shown on Civil.
2. Alternate: At Service Yard Provide 8' steel frame with louver infill as indicated at 3/A4.03. At Recycling Enclosure, provide 6' high steel frame with louver infill as shown at 4/A4.03

E. Alternate No. 5: Not Used.

F. Alternate No. 6: Fire Rated Storefront at Vestibule

1. Base Bid: Provide Hollow Metal frame and rated wood doors.
2. Alternate: Provide 120 minute Fire Rated Storefront system with 90 minute rated doors.

G. Alternate No. 7: Painting in Gymnasium 120

1. Base Bid: Do not paint in Gymnasium 120.
2. Alternate: Paint previously painted brick at 1st floor level, ceiling, and ductwork. Do not paint previously unpainted surfaces.

END OF SECTION 01 23 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 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. Requests for Information (RFIs).
 - 4. Project Web site.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

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

1.3 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. Use CSI Form 1.5A. Include the following information in tabular form:
 - 1. Name, address, and telephone number 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.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.4 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.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out 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.

1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, 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. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Design Professional 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 ceiling plenum to accommodate layout of light fixtures 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. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) 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.
 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 9. Review: Design Professional will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Design Professional determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Design Professional will so inform Contractor, who shall make changes as directed and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
 3. Design Professional will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Design Professional makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Digital Data Software Program: Drawings are available in Portable Data File (PDF) format or DWG.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Design Professional.
- 1.6 REQUESTS FOR INFORMATION (RFIs)
- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Design Professional will return RFIs submitted to Design Professional by other entities controlled by Contractor with no response.
 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 Design Professional.
 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, acceptable to Design Professional.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Design Professional's Action: Design Professional will review each RFI, determine action required, and respond. Allow seven working days for Design Professional's response for each RFI. RFIs received by Design Professional 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 Design Professional's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Design Professional's action may include a request for additional information, in which case Design Professional's time for response will date from time of receipt of additional information.
 3. Design Professional'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 General Conditions.

- a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Design Professional in writing within 10 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 monthly. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Design Professional.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Design Professional's response was received.
- F. On receipt of Design Professional's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Design Professional within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT WEB SITE

- A. The Owner will be using e-Builder for the Project Management Informational System (PMIS) for this project. Contractor will be trained and provided free access to e-Builder and will be required to utilize e-Builder for all PMIS processes including but not restricted to submittals, RFI's, contractor payment, change orders, reporting, and document control.

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 Design Professional of scheduled meeting dates and times.
 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 Design Professional, 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 Design Professional, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner Design Professional, 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.

3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - 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.
 4. 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 that requires 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 Design Professional 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. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Design Professional, but no later than 90 days prior to the scheduled date of Material Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Design Professional, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Material Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.
 - e. Requirements for delivery of material samples, attic stock, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Material Completion and for final payment.
 - i. Submittal procedures.
 - j. Coordination of separate contracts.
 - k. Owner's partial occupancy requirements.
 - l. Installation of Owner's furniture, fixtures, and equipment.
 - m. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at biweekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Design Professional, 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) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.
 - 15) Status of proposal requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) 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.

- F. Coordination Meetings: Conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner and Design Professional, 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 meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined 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.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Change Orders.
 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

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

- B. Related Requirements:
 - 1. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
 - 2. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical 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. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.

- C. 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.

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

- E. Event: The starting or ending point of an activity.

- F. 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.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
1. Working electronic copy of schedule file, where indicated.
 2. PDF electronic file.
- B. Startup construction schedule.
1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 3. Total Float Report: List of all activities sorted in ascending order of total float.
 4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.
- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit at monthly intervals.
- H. Material Location Reports: Submit at monthly intervals.

- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Special Reports: Submit at time of unusual event.
- K. Qualification Data: For scheduling consultant.

1.4 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including phasing work stages area separations interim milestones and partial Owner occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review submittal requirements and procedures.
 - 7. Review time required for review of submittals and resubmittals.
 - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 9. Review time required for Project closeout and Owner startup procedures.
 - 10. Review and finalize list of construction activities to be included in schedule.
 - 11. Review procedures for updating schedule.

1.5 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, 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.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. 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.
- B. Activities: Treat each story 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 01 33 00 "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. Material Completion: Indicate completion in advance of date established for Material Completion, and allow time for Architect's administrative procedures necessary for certification of Material Completion.
 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 1. Phasing: Arrange list of activities on schedule by phase.
 2. Work 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 01 10 00 "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 01 10 00 "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 Material 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. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Building flush-out.
 - m. Startup and placement into final use and operation.
8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Material Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Material Completion, and final completion, and the following interim milestones:
1. Temporary enclosure and space conditioning.
- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.
- 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 Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 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, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
1. Use Microsoft Project, for Windows 7 operating system.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for commencement of the Work. Base schedule on the 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 20 percent increments within time bar.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for commencement of the Work. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for commencement of the Work.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.

- e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
 5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 - a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
 - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.4 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. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Material Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials

previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. 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.

2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
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.

- C. 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.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 2. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 3. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 4. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Design Professional'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 Design Professional'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."
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule 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 Design Professional 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. 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.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Design Professional's final release or approval.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for purchasing.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Design Professional's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Design Professional for Contractor's use in preparing submittals.
 1. Design Professional will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
 - a. Design Professional makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in DWG and RVT.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Design Professional.
 - d. The following digital data files will be furnished for each appropriate discipline:
 - 1) Floor plans.
 - 2) Reflected ceiling plans.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Design Professional 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 Design Professional's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Design Professional 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 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Design Professional's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Design Professional and to Design Professional's consultants, allow 15 days for review of each submittal. Submittal will be returned to Design Professional before being returned to Contractor.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Design Professional.
 4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Design Professional.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Names of subcontractor, manufacturer, and supplier.
 - g. Category and type of submittal.
 - h. Submittal purpose and description.
 - i. Specification Section number and title.
 - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.

- l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal.
 - o. Transmittal number.
 - p. Submittal and transmittal distribution record.
 - q. Other necessary identification.
 - r. Remarks.
- E. Options: Identify options requiring selection by Design Professional.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. 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 Design Professional's action stamp.
- H. 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.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Design Professional's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 1. Submit electronic submittals via email as PDF electronic files.
 - a. Design Professional will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:

- a. Manufacturer's 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 showing 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 or concurrent with Samples.
6. Submit Product Data in the following format:
- a. PDF electronic file.
- C. 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, unless submittal based on Design Professional's digital data drawing files is otherwise permitted.
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.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.

- b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 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. Design Professional 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. Design Professional 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.
- E. 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.
5. Submit product schedule in the following format:
 - a. PDF electronic file.

- F. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation."
- H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."
- I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
- J. Maintenance Data: Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."
- K. 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 Design Professionals and owners, and other information specified.
- L. 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.
- M. 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.
- N. 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.
- O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- Q. 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.
- R. 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.

- S. 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:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.

- T. 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.

- U. 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.

- V. 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.

- W. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Design Professional.

- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action 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 Design Professional.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGN PROFESSIONAL'S ACTION

- A. Action Submittals: Design Professional will review each submittal, make marks to indicate corrections or revisions required, and return it. Design Professional will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Design Professional will review each submittal and will not return it, or will return it if it does not comply with requirements. Design Professional 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 Design Professional.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Design Professional without action.

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Design Professional, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. 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. Services do not include contract enforcement activities performed by Design Professional.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, 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.
 - 1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. 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, 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).
- J. Experienced: When used with an entity or individual, "experienced" 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.

1.3 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Design Professional for a decision 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 Design Professional for a decision before proceeding.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
 - 1. Indicate manufacturer and model number of individual components.
 - 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data : For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Design Professional.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Design Professional.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Design Professional. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
 - 2. .
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 - 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Design Professional has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of technical representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.8 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.
- 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, 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. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting 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. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Design Professional, 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.
- K. 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 in location and of size indicated or, if not indicated, as directed by Design Professional.
 2. Notify Design Professional seven days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.

4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Design Professional's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.9 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 inspecting they are engaged to perform.
 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
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. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these 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 48 hours in advance of time when Work that requires testing or inspecting 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 inspecting 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.
- C. 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 01 33 00 "Submittal Procedures."

- D. 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.
- E. 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.
- F. Testing Agency Responsibilities: Cooperate with Design Professional and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Design Professional and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location 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 any duties of Contractor.
- G. Associated Services: Cooperate with agencies 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 inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-

control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Design Professional, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Design Professional and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Design Professional with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Material Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

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 Design Professional.
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 Design Professional's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, 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 01 73 00 "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 01 40 00

SECTION 01 41 00 – REGULATORY REQUIREMENTS *(NPDES STORMWATER PERMIT COMPLIANCE)*

PART 1 - GENERAL

1.1 SUMMARY

- a) The OWNER shall execute the Notice of Intent of the NPDES Stormwater General Permit No. GAR 100001 as the Owner. The CONTRACTOR shall execute the Notice of Intent of the NPDES Stormwater General Permit No. GAR 100001 as the Operator. The CONTRACTOR shall provide inspection, compliance monitoring, and sampling in accordance with the NPDES Permit. The CONTRACTOR shall install BMP measures as called for on the construction drawings and maintain these measures throughout the length of the project.

PART 2 - PRODUCTS

n/a

PART 3 - EXECUTION

3.1 NPDES STORMWATER PERMIT (Permit)

- a) The Owner shall execute Notice of Intent as the Owner and pay applicable NPDES application fee.
- b) The Owner is responsible for submitting Erosion, Sedimentation and Pollution Control Plans to the GA EPD and for obtaining approval of said plans.
- c) The Contractor shall provide the services of a Qualified Person to perform daily inspections and documenting in accordance with the Permit. The Owner shall provide the services of a Qualified Person to provide weekly inspections and documenting in accordance with the Land Disturbing Activity Permit and shall provide NPDES related water quality sampling.
- d) The Contractor shall be responsible for permit compliance in his performance of the contract and in the work of any of his subcontractors until a Notice of Termination is issued when the project has achieved final stabilization.
- e) The Contractor shall keep a copy of the ESPCP and Permit on site.
- f) The Contractor shall not allow a stormwater discharge or release of any oil or hazardous material.
- g) The Contractor shall notify the Design Professional immediately of the failure of any Best Management Practices (BMPs).
- h) The Contractor shall implement the ESPCP prior to beginning construction.

3.2 MEASUREMENT AND PAYMENT

Measurement and payment for work under this section shall be included in overall project lump sum amount unless otherwise specified in Section 01 22 00.

END OF SECTION 01 41 00.

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 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.

1.2 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.

1.3 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.abma.com.
 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. AWPA - American Wood Protection Association; www.awpa.com.
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. CEA - Consumer Electronics Association; www.ce.org.
51. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
52. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
53. CGA - Compressed Gas Association; www.cganet.com.
54. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
55. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
56. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
57. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
58. CPA - Composite Panel Association; www.pbmdf.com.
59. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
60. CRRC - Cool Roof Rating Council; www.coolroofs.org.
61. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
62. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
63. CSI - Construction Specifications Institute (The); www.csinet.org.
64. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
65. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
66. CWC - Composite Wood Council; (See CPA).
67. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
68. DHI - Door and Hardware Institute; www.dhi.org.
69. ECA - Electronic Components Association; (See ECIA).
70. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
71. ECIA - Electronic Components Industry Association; www.eciaonline.org.
72. EIA - Electronic Industries Alliance; (See TIA).
73. EIMA - EIFS Industry Members Association; www.eima.com.
74. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
75. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
76. ESTA - Entertainment Services and Technology Association; (See PLASA).
77. EVO - Efficiency Valuation Organization; www.evo-world.org.
78. FCI - Fluid Controls Institute; www.fluidcontrolsintstitute.org.
79. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
80. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
81. FM Approvals - FM Approvals LLC; www.fmglobal.com.

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

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

178. SSINA - Specialty Steel Industry of North America; www.ssina.com.
179. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
180. STI - Steel Tank Institute; www.steel tank.com.
181. SWI - Steel Window Institute; www.steelwindows.com.
182. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
183. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
184. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
185. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
186. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
187. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
188. TMS - The Masonry Society; www.masonrysociety.org.
189. TPI - Truss Plate Institute; www.tpinst.org.
190. TPI - Turfgrass Producers International; www.turfgrasssod.org.
191. TRI - Tile Roofing Institute; www.tilerroofing.org.
192. UL - Underwriters Laboratories Inc.; www.ul.com.
193. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
194. USAV - USA Volleyball; www.usavolleyball.org.
195. USGBC - U.S. Green Building Council; www.usgbc.org.
196. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
197. WASTEC - Waste Equipment Technology Association; www.wastec.org.
198. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
199. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
200. WDMA - Window & Door Manufacturers Association; www.wdma.com.
201. WI - Woodwork Institute; www.wicnet.org.
202. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
203. 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. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. 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. USDJ - 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/cdb.
 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. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 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 to use temporary services and facilities without cost, including, but not limited to, Design Professional, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and State Fire Marshal. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

- E. 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. Identify further options if proposed measures are later determined to be inadequate. 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.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 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. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with galvanized barbed-wire top strand.
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

- D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Design Professional, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 12 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.
 - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 - 6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
- C. 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. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. 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 and clean HVAC system as required in Section 01 77 00 "Closeout Procedures".

- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "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.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. 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.
- F. 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 according to coordination drawings.
 - 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.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 1. Install electric power service overhead unless otherwise indicated.
- J. 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.
 2. Install lighting for Project identification sign.
- K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine in each field office.
 - b. Provide one telephone line(s) for Owner's use.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Design Professional's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.

3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- L. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Design Professional and Owner to access Project electronic documents and maintain electronic communications.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 2. Maintain support facilities until Design Professional schedules Material Completion inspection. Remove before Material Completion. Personnel remaining after Material Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas.
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Material Completion. Repair hot-mix asphalt base-course pavement before installation of final course.
- D. 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.
- E. Parking: Provide temporary parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 2. 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.
 3. Maintain and touchup signs so they are legible at all times.
- H. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- I. 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 01 73 00 "Execution."
- J. 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.
- K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- L. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Material Completion.
- 3.4 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.
 - 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 erosion- and sedimentation-control Drawings requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

- E. 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.
- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Material Completion. Perform control operations lawfully, using environmentally safe materials.
- G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- L. 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 gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
 - 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 4. Insulate partitions to control noise transmission to occupied areas.

5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 6. Protect air-handling equipment.
 7. Provide walk-off mats at each entrance through temporary partition.
- M. 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.
 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.

3.5 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 Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: 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, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: 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. Use permanent HVAC system to control humidity.

3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Design Professional.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 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. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Material Completion.
- E. 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 Material 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. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Material Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 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 01 23 00 "Alternates" for products selected under an alternate.
 - 2. Section 01 42 00 "References" for applicable industry standards for products specified.

1.2 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 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 specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify 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. Design Professional's Action: If necessary, Design Professional will request additional information or documentation for evaluation within one week of receipt of a comparable

product request. Design Professional will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Form of Approval: As specified in Section 01 33 00 "Submittal Procedures."
 - b. Use product specified if Design Professional 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 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 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.

1.5 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.

1.6 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 01 77 00 "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. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Design Professional will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 6. 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.
- B. Product Selection Procedures:
 - 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

2. 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.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 4. Manufacturers:
 - a. Restricted List: 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 not be considered.
 5. 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.
- C. Visual Matching Specification: Where Specifications require "match Design Professional's sample", provide a product that complies with requirements and matches Design Professional's sample. Design Professional'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 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Design Professional from manufacturer's full range" or similar phrase, select a product that complies with requirements. Design Professional 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: Design Professional will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with 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 Design Professionals and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 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. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of work.

- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for limits on use of Project site.
 - 2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
 - 3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 4. Section 02 41 19 "Selective Demolition" for demolition and removal of selected portions of the building.
 - 5. Section 07 84 13 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.

- B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- E. Certified Surveys: Submit two copies signed by professional engineer.
- F. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. 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 Design Professional of locations and details of cutting and await directions from Design Professional 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. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.

- k. Operating systems of special construction.
- 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. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
- 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 Design Professional's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. 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.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- 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 Design Professional 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.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- 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. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. 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.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. 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 Design Professional according to requirements in Section 01 31 00 "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 Design Professional promptly.
- B. General: Engage a professional engineer to 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 Design Professional when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Design Professional.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. 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.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Design Professional. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Design Professional before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 2. Recording: At Material Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

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.
 4. Maintain minimum headroom clearance of **96 inches (2440 mm)** in occupied spaces and **90 inches (2300 mm)** in unoccupied spaces.
- 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 Material 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: Do not use tools or equipment that produce harmful 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 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 Design Professional.
 - 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: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- 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 minimize 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.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 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 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 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 (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- 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 Material 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 01 50 00 "Temporary Facilities and Controls."
- 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 Material 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 assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Material Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Material Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.

- B. Related Requirements:
 - 1. Section 01 73 00 "Execution" for progress cleaning of Project site.
 - 2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 4. Section 01 79 00 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.2 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Material Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

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

1.5 MATERIAL 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 Material Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Material 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. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, 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 Design Professional. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Design Professional's signature for receipt of submittals.
 - 5. Submit test/adjust/balance records.
 - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Material Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Material 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 Material Completion.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
 - 6. Advise Owner of changeover in heat and other utilities.
 - 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 - 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 9. Complete final cleaning requirements, including touchup painting.

10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Material Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Design Professional will either proceed with inspection or notify Contractor of unfulfilled requirements. Design Professional will prepare the Certificate of Material Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Design Professional, that must be completed or corrected before certificate will be issued.

1. Reinspection: 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.

1.6 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 01 29 00 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Design Professional's Material Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Design Professional. 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 pest-control final inspection report.

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, Design Professional will either proceed with inspection or notify Contractor of unfulfilled requirements. Design Professional 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 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. Use CSI Form 14.1A or form acceptable to the Design Professional.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Design Professional.
 - d. Name of Contractor.
 - e. Page number.

4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Architect will return annotated file.
 - b. PDF electronic file. Design Professional will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Design Professional for designated portions of the Work where commencement of warranties other than date of Material Completion is indicated, 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.
 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 (215-by-280-mm)** 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.
 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

- C. 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.

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 Material 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 neither planted nor 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. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.

- C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Material 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 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Design Professional will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Design Professional.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.

- C. Two paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Design Professional 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 Material Completion and at least 15 days before commencing demonstration and training. Design Professional will return copy with comments.
 - 1. Correct or revise each manual to comply with Design Professional's comments. Submit copies of each corrected manual within 15 days of receipt of Design Professional's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. 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."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: 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 Design Professional.
 7. Names and contact information for major consultants to the Design Professional 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. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. 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: Enable bookmarking of 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.
- F. Manuals, Paper Copy: 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 (215-by-280-mm) 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, and 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.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) 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.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. 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.
- C. 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.
- D. 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.

2.4 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.

2.5 PRODUCT MAINTENANCE MANUALS

- A. 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.
- B. 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.
- C. 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.
- D. 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.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. 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.

2.6 SYSTEMS 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 warranty and bond information, 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: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
 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.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. 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.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, 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.
 - 1. 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.

- F. 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 operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Section 01 78 39 "Project Record Documents."

- G. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

SECTION 01 78 39 - 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.
 - 4. Miscellaneous record submittals.

- B. Related Requirements:
 - 1. Section 01 73 00 "Execution" for final property survey.
 - 2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
 - 3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints and one of file prints.
 - 2) Design Professional will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit PDF electronic files of scanned record prints and one set(s) of prints.
 - 2) Print each drawing, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit one paper copy annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

- E. Reports: Submit written report indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

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. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Design Professional's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

- B. Record Digital Data Files: Immediately before inspection for Certificate of Material Completion, review marked-up record prints with Design Professional. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 2. Format: RVT, Version 2016, Microsoft Windows operating system. (Contractor Option)
 3. Format: Annotated PDF electronic file with comment function enabled.
 4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 5. Refer instances of uncertainty to Design Professional for resolution.
 6. Design Professional will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 01 33 00 "Submittal Procedures" for requirements related to use of Design Professional's digital data files.
 - b. Design Professional will provide data file layer information. Record markups in separate layers.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Design Professional determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Design Professional for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. 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. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Design Professional.
 - e. 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. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

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 annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

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 PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

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 Design Professional's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.3 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Design Professional.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of Demonstration or Training.
 - 2. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals in PDF electronic file format on compact disc.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.
- B. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Design Professional.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.

- g. Limiting conditions.
 - h. Performance curves.
- 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
- 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.

- b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 3. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner, through Design Professional, with at least seven days' advance notice.
- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral or a demonstration performance-based test.

- E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 01 79 00

SECTION 02 22 30 - ENGINEERED FILL (EF)

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 DESCRIPTION

- A. Work included: Provide Engineered Fill for locations as shown on the drawings, as specified herein, and as needed for a complete and proper installation.
- B. Work not included, but related to this Section: Excavation and site preparation for the Engineered Fill including random flooding, drainage considerations, dewatering (if needed), installation of utilities within the Engineered Fill, final surface treatment, and subsequent pavement. The General Contractor shall provide an acceptable water source and work space for this application.

1.3 QUALITY ASSURANCE

- A. The Engineered Fill applicator shall be approved by the Manufacturer of the Engineered Fill. Use skilled workmen who are experienced and familiar with the requirements and the methods for proper performance of this work.
- B. The specialized batching, mixing, and placing equipment shall be automated with bulk handling equipment approved by the manufacturer. Bulk cement shall be weighed on a scale that operates within a tolerance of 1-1/2% per batch. Transit mixers and volumetric batching mixers are not acceptable for these low density applications.
- C. The approved applicator shall be regularly engaged in the placement of Engineered Fill with a minimum of (5) five years of experience.

1.4 SUBMITTALS

- A. Provide manufacturers standard literature to include required mix designs for application as shown on drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Expansion Material (Basis of design): The expansion material shall be Elastizell JLE that meets ASTM C869 when tested in accordance with ASTM C796. The Engineered Fill shall meet the

properties of Section 2.2. Alternate manufacturers must be submitted (10) ten days prior to bid and must be approved by the engineer of record.

- B. Cement: Portland cement shall comply with ASTM C150. Pozzolans and other cementitious materials may be used.
- C. Water: Use potable water.
- D. Admixtures: Admixtures may be used when specifically approved by the Manufacturer of the Engineered Fill.

2.2 PROPERTIES: The Engineered Fill shall meet the following:

	<u>Class IV</u>
Maximum Cast Density	42 pcf
Minimum Compressive Strength @ 28 days	120 psi
Coefficient of Permeability (cm/sec) @ 13.8 kPa (2.0 psi)	1×10^{-5}
Frost Heave per BRRL LR90 (250 hour exposure) 11.43 cm (4.5") high x 10.16 cm (4") diameter	< 1.25 cm (0.5")

PART 3 - EXECUTION

- 3.1 SITE CONDITIONS: Examine the areas under which work of this Section will be performed. The General Contractor shall correct conditions detrimental to timely and proper completion of the work before installation begins.
- 3.2 PREPARATION: The installation of the Engineered Fill shall be in accordance with the manufacturer's procedures. The fill area shall not have standing water in it. Items encased in the fill shall be set and stable prior to installing the Engineered Fill.
- 3.3 INSTALLATION: Use automated job site batching, mixing, and placing equipment certified by the manufacturer. Mix the materials and convey promptly to the point of placement. Cast the Engineered Fill in lift thicknesses as recommended by the Manufacturer. The final surface finish shall be within ± 0.16 foot of plan elevation. Double casting is an acceptable method of installation.
- 3.4 SAMPLING: During placement of the initial batches, check the density and adjust the mix as required to obtain the specified cast density at the point of placement. Take four (4) test specimens for each 300 cubic yards of Engineered Fill placed or every four (4) hours of placing.

- 3.5 TESTING: Test in accordance with ASTM C796 except do not oven dry load test specimens. The specimens shall be 3" diameter x 6" high cylinders covered after casting to prevent damage and loss of moisture. Moist cure the specimens at least up to 3 days prior to a 28-day compressive strength test. Specimens may be tested at any age to monitor the compressive strength.

END OF SECTION 02 22 30

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SECTION 02 41 00 - DEMOLITION

PART 1 - GENERAL

1.1 SCOPE:

Under this heading shall be included all operations necessary for demolition of the existing structures, foundations, track work and utilities as shown.

PART 2 – PRODUCTS

N/A

PART 3 - EXECUTION

3.1 PROCEDURES:

The procedures proposed for the accomplishment of salvage and demolition work shall be submitted for review. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The submittal shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operation.

3.2 DUST CONTROL:

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding, and pollution.

3.3 DISCONNECTION OF UTILITY SERVICES:

Utilities shall be disconnected at the points indicated. Where such disconnection will interrupt the utility services to an area not included in the Contract, arrangements for such interruption shall be reviewed with the Design Professional and the Owner Project Manager at least 72 hours in advance of the interruption. Where water and sewer lines are disconnected or removed the remaining utility shall be plugged and left in such a manner that reconnection can be made. The need to temporarily "cut-off" any utility shall be coordinated with the appropriate utility provider.

3.4 BURNING:

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

3.5 PROTECTION OF EXISTING WORK:

Existing work to remain shall be protected from damage. Work damaged by the Contractor shall be repaired or restored to its original condition or acceptable equivalent.

3.6 EXISTING UTILITIES:

a) Utility Services.

Disconnections of utility services shall be coordinated so as not to affect service to other areas outside of the project limits. The Owner of all utilities must be contacted prior to proceeding with work. Temporary interruption of utility service shall be coordinated with the appropriate utility provider. In most cases the utility provider is.

b) Utilities.

Remove or abandon all existing utilities as indicated. When utility lines are encountered, that are not indicated on the drawings, they shall be identified and properly addressed by contacting the affected utility service provider.

3.7 DISPOSITION OF MATERIAL:

a) Title to Materials.

Title to all materials and equipment to be demolished is vested in the Contractor upon receipt of notice to proceed (unless noted otherwise on the plans). The Owner will not be responsible for the condition, loss, or damage to such property after notice to proceed.

b) Material for Salvage.

Material which is salvageable shall be returned to Owner. Coordinate with Owner Project Manager.

c) Unsalvageable Materials.

Concrete, masonry, and other noncombustible materials, other than concrete permitted to remain in place, shall be disposed of by the Contractor off the property. Other materials such as non-useable crossties, lumber, etc. shall be removed from the site and property of by the Contractor.

3.8 HISTORICAL ITEMS:

There are no known historical items on the project site; however, if historical items are discovered, contact the Owner Project Manager and await his/her directions before removing any historical items.

3.9 CLEANUP:

Remove debris and rubbish from the site as soon as practicable. Do not allow debris or rubbish to accumulate in buildings or on site. Remove and transport debris, in a manner as to prevent spillage on streets or adjacent areas, to a proper disposal or recycling facility.

3.10 MEASUREMENT AND PAYMENT:

Measurement and payment for work under this section shall be included in overall project lump sum amount unless otherwise specified in Section 01 22 00.

END OF SECTION 02 41 00.

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SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

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

B. Related Requirements:

1. Section 01 73 00 "Execution" for cutting and patching procedures.
2. Section 02 20 00 "Earthwork" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- C. 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.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition 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.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
1. Inspect and discuss condition of construction to be selectively demolished.
 2. Review structural load limitations of existing structure.
 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.

4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
 - 1. Existing modified bitumen roof.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.10 COORDINATION

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch during and for at least four hours after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. .
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

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

END OF SECTION 02 41 19

SECTION 03 30 00 - 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 WORK INCLUDED

- A. Provide all cast-in-place concrete, complete, in place, as indicated on the Drawings, specified herein and required for the complete installation.

1.3 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
 - 1. Foundations and footings.
 - 2. Slabs-on-grade.
 - 3. Foundation walls.
 - 4. Equipment pads and bases.
 - 5. Grout fill for concrete masonry walls.

1.4 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
- C. Shop drawings for Concrete Reinforcement:
 - 1. Shop drawings shall be submitted by the Contractor to the Architect and review action received prior to fabrication. When corrections are required, copies will be returned noting such. Drawings shall then be corrected and resubmitted until final review action is received. Coordination of shop drawing shall be such that corrections noted on one sheet that affects another drawing will be transmitted and made on all sheets and also resubmitted.
 - 2. Shop drawings shall also include:
 - a. Location of all proposed construction joints, keying and waterstops;
 - b. Location of all openings, depressions, construction and control joints, trenches, sleeves, inserts and items affecting the reinforcement and placing of concrete.
 - 3. The Contractor shall be responsible for checking quantities and dimensions in accordance with contract drawings. Where discrepancies in dimensions are noted, the Contractor shall notify the Architect of such discrepancies and corrected dimensions will then be furnished by the Architect. Corrected dimensions shall be reflected on shop drawings.

4. Contract drawings receive precedence over shop drawings unless otherwise authorized in writing.
 5. Shop drawings furnished for reinforcing steel shall contain fabrication details as well as placement drawings which are to be used in conjunction with contract drawings.
 6. Detailing and fabrication of reinforcing shall conform to ACI 315 "Details and Detailing of Concrete Reinforcement", and ACI 315R "Manual of Engineering and Placing Drawings for Reinforced Concrete Structures".
- D. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:
1. Color finishes.
 2. Normal weight aggregates.
 3. Reglets.
 4. Vapor barrier.
 5. Form liners.
- E. Submit 5 copies of laboratory test reports for concrete materials and mix design test. All concrete mix designs shall be prepared by a qualified testing laboratory.
- F. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- G. Review Action: Submittals are reviewed for general conformance with the design concept only and are subject to all requirements of the contract documents. Contractor is responsible for dimensions, quantities and coordination with other trades. Reviews do not authorize any changes involving additional cost unless stated in separate letter or change order.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 2. ACI 311.4R, "Manual of Concrete Inspection."
 3. ACI 318, "Building Code Requirements for Reinforced Concrete."
 4. ACI 304R, "Guide for Measuring, Mixing, Transporting and Placing Concrete."
 5. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- B. Concrete Testing Service:
1. All testing services specified in this section of these specifications shall be performed by a recognized, independent laboratory approved by the Architect.
 2. All expenses of the testing agency shall be borne by the Contractor.
 3. The Contractor shall furnish to the testing agency samples of all proposed material to be used which requires testing.
 4. Testing agency shall check and review proposed materials to be used for compliance with these specifications, perform all testing in accordance with referenced standards and provide all reports.
 5. Contractor shall furnish all project specifications, testing material, mill reports, design mixes and cylinders, and shall notify laboratory of concrete pouring schedules so as not to delay progress of the work.
 6. No material or mixes shall be used on project unless approved by the Architect.

7. Materials and installed work may require testing and retesting, as directed by the Architect, at anytime during the progress of the work. Allow free access to material stockpiles and facilities at all times. Retesting of rejected material and installed work, shall be provided at the Contractor's expense.
- C. Tests for Concrete Materials:
 1. Portland cement shall be sampled and tested to determine the properties in accordance with ASTM C 150.
 2. Aggregates shall be sampled and tested in accordance with ASTM C 33 (normal weight).
- D. Supervision: All reinforced concrete construction shall be performed under the personal supervision of the contractor's superintendent. This superintendent shall keep a record of all concrete poured on the job. The record shall show in detail the area poured, the time and date of the pour and weather conditions which existed at the time of the pour. Upon completion of the work, this record shall be turned over to the Architect.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration to match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.
- D. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- E. Form Ties:
 1. Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.
 2. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 1064, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 1064, welded steel wire fabric.
- D. Deformed-Steel Welded Wire Fabric: ASTM A 497.

- E. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, including thickened slab areas, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).
 - 3. For foundations, support reinforcing in bottom at footings with whole concrete bricks at 4'-0" on center.

2.3 CONCRETE MATERIALS

- A. Portland Cement:
 - 1. Comply with ASTM C 150, Type I.
 - 2. Use one brand of cement throughout Project unless otherwise acceptable to Architect.
- B. Fly Ash: ASTM C 618, Type F.
- C. Normal-Weight Aggregates:
 - 1. Comply with ASTM C 33 Class 4M and as specified. Provide aggregates from a single source for exposed concrete.
 - 2. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
 - 3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.
 - 4. Do not use aggregates containing soluble salts, iron sulphide, pyrite, marcasite or ochre which can cause strains on exposed concrete surfaces.
 - 5. Dune sand, bank run sand and manufactured sand are not acceptable.
 - 6. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Washed gravel, either natural or crushed. Use of pit or bank run gravel is not permitted.
 - c. Maximum Aggregate Size: Not larger than one-fifth of the narrowest dimension between sides of forms, one-third of the depths of slabs nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars nor over 1" in max. size except for block fill where max. size shall not exceed ½".

These limitations may be waived if, in the judgement of the Architect, workability and methods of consolidation are such that concrete can be placed without honeycomb or voids.
- D. Water: Potable.
- E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- F. Air-Entraining Admixture:
 - 1. Comply with ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

- G. Water-Reducing Admixture:
 - 1. Comply with ASTM C 494, Type A.
- H. High-Range Water-Reducing Admixture:
 - 1. Comply with ASTM C 494, Type F or Type G.
- I. Water-Reducing, Accelerating Admixture:
 - 1. Comply with ASTM C 494, Type E.
- J. Water-Reducing, Retarding Admixture:
 - 1. Comply with ASTM C 494, Type D.
- K. Calcium Chloride: Calcium chloride will not be permitted in concrete.

2.4 RELATED MATERIALS

- A. Preformed Expansion Joint Fillers: Premolded fillers shall meet "Specifications for Premolded Expansion Joint Fillers for Concrete Paving and Structural Construction", ASTM D 1751.
- B. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- C. Slab on Grade Floor Joint Forms:
 - 1. Interior spaces: 24 ga., pre-shaped keyed type galvanized steel joint forms and stakes. Galvanizing shall be hot-dipped conforming to ASTM A 653 Grade 80 Steel G90 coating class.
 - 2. Exterior spaces: Wood or metal removable tongue and groove joint forms.
- D. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 pounds of fluosilicates per gallon.
- E. Sand Fill: Clean, manufactured or natural sand.
- F. Membrane-Forming Curing Compound: ASTM C 1315, 30% solids content minimum, Type 1, Class A.
- G. Vapor Barrier: Provide vapor barrier that is resistant to deterioration when tested according to ASTM E 1745, as follows:
 - 1. Membrane sheet not less than 15 mils thick, meeting ASTM E 1745, Class C.
- H. Nonslip Aggregate Finish: Provide fused aluminum oxide granules or crushed emery as the abrasive aggregate for a nonslip finish, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, nonglazing, and unaffected by freezing, moisture, and cleaning materials.
- I. Colored Wear-Resistant Finish:
 - 1. Use packaged dry combination of materials consisting of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground nonfading mineral oxides interground with cement. Color as selected by Architect from manufacturers' standards, unless otherwise indicated.

- J. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- K. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- L. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A.

2.5 PROPORTIONING AND DESIGNING MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
 - 1. Limit use of fly ash to not exceed 25 percent of cement content by weight.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
 - 1. Exterior Concrete, Exposure Category F:
 - a. Formed Concrete (Class F1): 4500 psi, 28-day compressive strength; 0.45 water/cement; air-entrained.
 - b. Slab on Grade (Class F2): 4500 psi, 28-day compressive strength; 0.45 water/cement; air-entrained.
 - c. Foundations (Class F0): 3000 psi, 28-day compressive strength; non-air-entrained.
 - 2. Interior Concrete:
 - a. Formed Concrete: 4000 psi, 28-day compressive strength; 564 lbs. Cement per cubic yard minimum; non-air-entrained.
 - b. Slabs on Grade: 3000 psi, 28-day compressive strength; non-air-entrained.
 - c. Foundations: 3000 psi, 28-day compressive strength; non-air-entrained.
 - 3. Concrete Masonry Grout: 2500 psi, 28-day compressive strength.
- D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - 1. Ramps, slabs, and sloping surfaces: Not more than 4 inches.
 - 2. Reinforced foundation systems: Not less than 1 inch and not more than 4 inches.
 - 3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
 - 4. Concrete masonry grout: not less than 8 inches and not more than 11 inches.
 - 5. Other concrete: Not more than 4 inches.
- E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work. No water shall be added to concrete mix at job site unless approved by Architect, except where indicated on delivery ticket that water has been withheld at batch plant and total amount of water does not exceed the total amount of mix water on the approved mix design.

2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.
- D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 4.5 percent (Exposure Class F1); 5.5 percent (Exposure Class F2) for 1-1/2-inch maximum aggregate.
 - b. 4.5 percent (Exposure Class F1); 6.0 percent (Exposure Class F2) for 1-inch maximum aggregate.
 - c. 5.0 percent (Exposure Class F1); 6.0 percent (Exposure Class F2) for 3/4-inch maximum aggregate.
 - d. 5.5 percent (Exposure Class F1); 7.0 percent (Exposure Class F2) for 1/2-inch maximum aggregate.
 - 2. Other concrete not exposed to freezing and thawing (Exposure Class F0), or hydraulic pressure, or to receive a surface hardener. No air-entrainment. Maximum total air content shall not exceed 3 percent.
- E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

- A. Job-Site Mixing:
 - 1. Mix concrete materials in appropriate drum-type batch machine mixer. For mixers of 1 cu. yd. or smaller capacity, 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. For mixers of capacity larger than 1 cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd.
 - 2. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- B. Ready-Mixed Concrete:
 - 1. Comply with requirements of ASTM C 94, and as specified.
 - 2. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General:
 - 1. Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 - 2. Provide Class A tolerances for concrete surfaces exposed to view.
 - 3. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR BARRIER INSTALLATION

- A. General: Place vapor barrier sheeting in position with longest dimension parallel with direction of pour.

- B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.4 PLACING REINFORCEMENT

- A. General:
 - 1. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
 - 2. Avoiding cutting or puncturing vapor barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.
- D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at all points of contact between slabs-on-grade and vertical surfaces column pedestals, foundation walls, grade beams and elsewhere as indicated on the drawings.

3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Construction Joints in Slabs-on-Grade:
 - 1. Construction joints for slab-on-grade (floor joints) shall be tongue and groove key type wood or steel joint form. Prefabricated metal floor joint forms shall be installed as per manufacturer's instructions.

2. All floor joints to be removed shall be painted on one side with grease or mastic to prevent bond.
 3. Galvanized steel interior floor joint forms may be set to permit simultaneous pouring of concrete on both sides. Metal form to be left in place.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS AND ANCHORS

- A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- C. Install dovetail anchor slots in concrete structures as indicated on drawings.
- D. Edge Forms and Screed Strips for Slabs: Set edge forms, or bulkheads and intermediate screed strips for slabs to obtain the elevations and contours in the finished slab surface. Provide and secure units to support the type of screed strips by the use of strike-off templates or accepted compacting type screeds. Screed strips are to be constructed, supported and set to avoid displacement of reinforcing steel positions.
- E. All post-installed mechanical anchors shall be tested in accordance with ACI 355.2 and shall be installed as directed by the inspected manufacturer's written instructions and in accordance with the ICC-ES report.
- F. All post-installed adhesive anchors shall be tested in accordance with ACI 355.4 and shall be installed as directed by the inspected manufacturer's written instructions and in accordance with the ICC-ES report.

3.7 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

- B. General: Comply with ACI 304R, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms:
 - 1. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 2. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309R.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators 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 set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- E. Placing Concrete Slabs:
 - 1. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
 - 2. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 - 3. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 4. Maintain reinforcing in proper position on chairs during concrete placement.
- F. Cold-Weather Placement: Comply with provisions of ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305R and as specified.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled 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. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
 1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Grout-Cleaned Finish:
 1. Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
 2. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 3. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
 1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish:

1. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
2. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish:

1. Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
2. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 38 (floor flatness) and F(L) 30 (floor levelness) and minimum local tolerances of F(F) 25 and F(L) 20 measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

EXCEPTION: For slab surfaces scheduled to receive terrazzo, thin-set ceramic finish surfaces to tolerances of F(F) 50 (floor flatness) and F(L) 30 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

E. Nonslip Broom Finish:

1. Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
2. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

F. Nonslip Aggregate Finish:

1. Apply nonslip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and where indicated.
2. After completing float finishing and before starting trowel finish, uniformly spread 25 lb of dampened nonslip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.
3. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose nonslip aggregate.

G. Chemical Hardener Finish:

1. Apply chemical hardener finish to all exposed dry interior concrete floors exposed to view.
2. Apply liquid chemical hardener after complete curing and drying of the concrete surface.

3. Dilute the liquid hardener with water and apply three coats:
 First Coat: 1/3 strength
 Second Coat: 1/2 strength
 Third Coat: 2/3 strength
 4. Evenly apply all coats and allow 24 hours drying time between coats.
 5. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instruction.
 6. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.
- H. F(L) and F(F) Exceptions:
1. F(L) tolerances and testing specified herein shall not be applicable to formed elevated concrete slab surfaces.
 2. F(L) and F(F) tolerances and testing specified shall not be applicable to surfaces within two feet of any floor joints, pre-positioned embedments, or any types of full-depth penetrations in accordance with ASTM E-1155.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels, bond beams and vertically reinforced cells where indicated on the drawings or as scheduled. Maintain accurate location of reinforcing steel during concrete placement. All masonry voids to be kept clean of mortar fins or obstructions to ensure complete filling of designated cells.

3.12 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

- D. Provide moisture curing by the following methods:
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Use continuous water-fog spray.
 - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
 - 1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
 - 1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas 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.
- C. Repairing Formed Surfaces:
 - 1. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and

- stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
2. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces:
1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 2. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 3. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 4. Correct low areas in unformed surfaces 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. Proprietary underlayment compounds may be used when acceptable to Architect.
 5. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Architect.

3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Contractor will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

- c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 3. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
 4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
- C. Test results will be reported in writing to the Architect within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Floor Tolerance Testing: Test slab in accordance with ASTM E1155 within 24 hours of the final troweling. Provide tolerance report including key plan showing location and results of testing to the Architect.
- F. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03 30 00

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SECTION 03 45 00 - PRECAST ARCHITECTURAL 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:
 - 1. Architectural precast concrete trim units.
- B. Related Requirements:
 - 1. Section 04 20 00 "Unit Masonry".

1.3 ALLOWANCES

1.4 DEFINITIONS

- A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by Architect.

1.5 PREINSTALLATION MEETINGS

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

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.
- C. Shop Drawings:
 - 1. Detail fabrication and installation of architectural precast concrete units.
 - 2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.
 - 3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
 - 4. Indicate details at building corners.
 - 5. Indicate separate face and backup mixture locations and thicknesses.
 - 6. Indicate locations, extent, and treatment of dry joints if two-stage casting is proposed.

7. Include plans and elevations showing unit location and sequence of erection for special conditions.
 8. Indicate relationship of architectural precast concrete units to adjacent materials.
 9. If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
- D. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.
1. When other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.
 2. Samples for each thin-brick unit required, showing full range of color and texture expected. Include Sample showing color and texture of joint treatment.
 - a. Grout Samples for Initial Selection: Color charts consisting of actual sections of grout showing manufacturer's full range of colors.
 - b. Grout Samples for Verification: Showing color and texture of joint treatment.
- E. Delegated-Design Submittal: For architectural precast concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Show governing panel types, connections, types of reinforcement, including special reinforcement, and concrete cover on reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from architectural precast concrete.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Material Certificates: For the following items:
 1. Cementitious materials.
- C. Material Test Reports: For aggregates.
- D. Preconstruction test reports.
- E. Source quality-control test reports.
- F. Field quality-control and special inspection reports.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A precast concrete erector who has retained a "PCI-Certified Field Auditor" to conduct a field audit of a project in same category as this Project and who can produce an Erectors' Post-Audit Declaration.
- B. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings.
 - 1. Designated as a PCI-certified plant for Group A, Category A1 - Architectural Cladding and Load Bearing Units at time of bidding or designated as an APA-certified plant for production of architectural precast concrete products.
- C. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."
- D. Mockups: After sample panel and range sample approval but before production of architectural precast concrete units, construct full-sized mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockup as indicated on Drawings including anchors, connections, flashings, and joint fillers.
 - 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 undamaged at time of Substantial Completion.

1.9 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground or other rehandling.
- B. Support units during shipment on nonstaining shock-absorbing material.
- C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
- D. Place stored units so identification marks are clearly visible, and units can be inspected.

- E. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.
- F. Lift and support units only at designated points indicated on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Southern Castings, Inc.
- B. PRC Precast, Inc.
- C. Miller-Mize Precast Inc.
- D. Source Limitations: Obtain Precast Architectural Concrete products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design architectural precast concrete units.
- B. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:
 - 1. Loads: As indicated.
 - 2. Dead Loads: .
 - 3. Wind Loads: As indicated. .
 - 4. Seismic Loads: As Indicated.
 - 5. Design precast concrete units and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements as follows:
 - a. Upward and downward movement of L/360.
 - 6. Thermal Movements: Provide for in-plane thermal movements resulting from annual ambient temperature changes of 120 deg F.

2.3 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that provides continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.
 - 1. Mold-Release Agent: Commercially produced form-release agent that does not bond with, stain or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.

- B. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete mixture to depth of reveal specified.

2.4 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

2.5 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or Type III, gray, unless otherwise indicated.
 - 1. For surfaces exposed to view in finished structure, use white cement, of same type, brand, and mill source.
- B. Supplementary Cementitious Materials:
 - 1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
 - 2. Blended Hydraulic Cement: ASTM C 595, Type I (PM), pozzolan-modified portland cement.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33/C 33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
 - 1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.
 - a. Gradation: To match design reference sample.
 - 2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand compatible with coarse aggregate; to match approved finish sample.
- D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.
 - 1. Water-Reducing Admixtures: 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. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
 - 5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing Admixture: ASTM C 1017/C 1017M, Type I.
8. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
9. Corrosion Inhibiting Admixture: ASTM C 1582/C 1582M.

2.6 STAINLESS-STEEL CONNECTION MATERIALS

- A. Stainless-Steel Plate: ASTM A 666, Type 304, Type 316, or Type 201.

2.7 ACCESSORIES

- A. Precast Accessories: Provide clips, hangers, high-density plastic shims, and other accessories required to install architectural precast concrete units.

2.8 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C 150/C 150M, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.

2.9 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
 1. Use a single design mixture for units with more than one major face or edge exposed.
 2. Where only one face of unit is exposed use either a single design mixture or separate mixtures for face and backup.
- B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.
- C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.
- D. Normal-Weight Concrete Mixtures: Proportion face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
 1. Compressive Strength (28 Days): 5000 psi minimum.
 2. Maximum Water-Cementitious Materials Ratio: 0.45.
- E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C 642, except for boiling requirement.
- F. Lightweight Concrete Backup Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.2, with materials to be used on Project, to provide lightweight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi.
2. Unit Weight: Calculated equilibrium unit weight of 115 lb/cu. ft., plus or minus 3 lb/cu. ft., according to ASTM C 567.

- G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.
- H. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.10 MOLD FABRICATION

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.
- B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
1. Form joints are not permitted on faces exposed to view in the finished work.
 2. Edge and Corner Treatment: Uniformly chamfered or radiused.

2.11 FABRICATION

- A. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.
1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcing exceeds limits specified in ASTM A 775/A 775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
 2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
 3. Place reinforcing steel and prestressing strands to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
 4. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
- B. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.
- C. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

- D. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.
- E. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.
 - 1. Place backup concrete mixture to ensure bond with face-mixture concrete.
- F. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 117.
 - 1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants." Ensure adequate bond between face and backup concrete, if used.
- G. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.
- H. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- I. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.12 FABRICATION TOLERANCES

- A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.
- B. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with the following product tolerances:
 - 1. Overall Height and Width of Units, Measured at the Face Exposed to View: As follows:
 - a. 10 feet or under, plus or minus 1/8 inch.
 - b. 10 to 20 feet, plus 1/8 inch, minus 3/16 inch.
 - c. 20 to 40 feet, plus or minus 1/4 inch.
 - d. Each additional 10 feet, plus or minus 1/16 inch.
 - 2. Total Thickness or Flange Thickness: Plus 1/4 inch, minus 1/8 inch.
 - 3. Bowing: Plus or minus L/360, maximum 1 inch.
 - 4. Local Smoothness: 1/4 inch/10 feet.
 - 5. Warping: 1/16 inch/12 inches of distance from nearest adjacent corner.
 - 6. Tipping and Flushness of Plates: Plus or minus 1/4 inch.
 - 7. Dimensions of Architectural Features and Rustications: Plus or minus 1/8 inch.

2.13 FINISHES

- A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved design reference sample and as follows:
 - 1. Acid-Etched Finish: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attack.
- B. Finish exposed top surfaces of architectural precast concrete units to match face-surface finish.
- C. Finish unexposed surfaces of architectural precast concrete units with as cast finish.

2.14 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, ASTM C 1610/C 1610M, ASTM C 1611/C 1611M, ASTM C 1621/C 1621M, and ASTM C 1712.
- B. Owner will employ an independent testing agency to evaluate architectural precast concrete fabricator's quality-control and testing methods.
 - 1. Allow Owner's testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with Owner's testing agency and provide samples of materials and concrete mixtures as may be requested for additional testing and evaluation.
- C. Strength of precast concrete units is considered deficient if units fail to comply with ACI 318 requirements for concrete strength.
- D. Testing: If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, precaster will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M and ACI 318.
 - 1. A minimum of three representative cores shall be taken from units of suspect strength, from locations directed by Architect.
 - 2. Test cores in an air-dry condition.
 - 3. Strength of concrete for each series of three cores is considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
 - 4. Report test results in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports include the following:
 - a. Project identification name and number.
 - b. Date when tests were performed.
 - c. Name of precast concrete fabricator.
 - d. Name of concrete testing agency.
 - e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at

breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

- E. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.
- F. Defective Units: Discard and replace recast architectural concrete units that do not comply with acceptability requirements in PCI MNL 117, including concrete strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups. Replace unacceptable units with precast concrete units that comply with requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting performance of the Work.
- B. Do not install precast concrete units until supporting masonry has attained minimum allowable design compressive strength and supporting steel or other structure is structurally ready to receive loads from precast concrete units.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.
 - 1. Install temporary steel or plastic spacing shims as precast concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
 - 2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
 - 3. Unless otherwise indicated, maintain uniform joint widths of 3/8 inch.
- B. Grouting or Dry-Packing Connections and Joints: Grout connections where required or indicated. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for not less than 24 hours after initial set.

3.3 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.4 REPAIRS

- A. Repair architectural precast concrete units if permitted by Architect. Architect reserves the right to reject repaired units that do not comply with requirements.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780/A 780M.
- D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.
- E. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.5 CLEANING

- A. Clean surfaces of precast concrete units exposed to view.
- B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
 - 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.
 - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 03 45 00

SECTION 03 51 13 CEMENTITIOUS WOOD-FIBER PLANK ROOF DECK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Cementitious wood fiber plank roof deck and form system.

B. Related Sections:

1. Division 3 Section Lightweight Insulating Concrete Roof Deck
2. Division 5 Section: Structural Steel
3. Division 5 Section Steel Joists
4. Division 7 Sections: Polyvinyl-Chloride (PVC) Roofing

1.2 REFERENCES

A. Underwriters Laboratories, Inc. (UL):

1. UL 580 Standard for Safety for Tests for Uplift Resistance of Roof Assemblies.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Provide a roof deck system that has been manufactured, fabricated and installed to provide deflection of less than $L/240$ at design load and comply with indicated uplift requirements.
2. Comply with requirements of Factory Mutual Class I Roof Deck.
3. **Refer to Structural for required uplift and diaphragm shear requirements.**

1.4 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 "Submittal Procedures".

B. Product Data: Submit manufacturer's product data and installation instructions.

C. Shop Drawings: Provide drawings indicating locations and spacing of planks.

D. Samples: Submit selection and verification samples as follows:

1. Set of 12 inch (305 mm) square samples for each wood fiber deck unit required, showing full range of exposed texture to be expected in completed work.
2. Labeled set of all accessories required for a complete installation.

E. Quality Assurance/Control Submittals: Submit the following:

1. Test Reports: Upon request, submit certified test reports from recognized test laboratories.
2. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

F. Closeout Submittals: Submit the following:

1. Warranty documents specified herein.

1.5 QUALITY ASSURANCE:

- A. Installer Qualifications: A firm or individual experienced in installing, erecting, 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, and has been in business under the same name for more than (5) Five years, and has been approved by the manufacturer of the product being installed. Installer shall have an office within 250 miles of the jobsite.
- B. Regulatory Requirements and Approvals:
 - 1. International Code Council:
 - a. ICC ERS 1112.
- C. Warranty: Provide a (20) year performance warranty from the manufacturer.

1.6 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 1. Provide labels indicating brand name, deck style, plank size and plank thickness.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
 - 1. Prevent soiling, physical damage or wetting.
 - 2. Store cartons open at each end to stabilize moisture content and temperature.

1.7 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.

PART 2 PRODUCTS

2.1 ROOF DECK AND FORM SYSTEMS

- A. Design of roof deck system is based on wood fiber roof deck panels as manufactured by Tectum Inc., Newark, OH. or one of the following. The panels consist of wood fibers bonded with an inorganic hydraulic cement binder.
 - 1. Tectum 1 Long Span Roof Deck Panels:
 - a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.
 - b. Nominal Panel Thickness: 3-inches.
- B. The following manufacturers are approved provided they meet or exceed the specified requirements:
 - a. Lamit Industries - Enviroplank
 - b. Heraklith, Inc.

2.2 ACCESSORIES

A. Provide accessories as follows:

1. Tectum Screws (Basis-of-Design):
 - a. Material: Steel.
 - b. Type: 12 gauge with 2 inch (51 mm) diameter washer
2. Construction Adhesive:
 - a. Manufacturer: Miracle Construction Adhesive.
 - b. Type: Adhesive SFA-66.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the roof deck panel manufacturer.

3.2 EXAMINATION

A. Site Verification of Conditions:

1. Verify that site conditions are acceptable for installation of roof deck panel system.
2. Do not proceed with installation of roof deck panel system until unacceptable conditions are corrected.

3.3 INSTALLATION

A. Roof Deck Plank Installation:

1. Place planks on joists with square cut ends butted tightly together.
 - a. Stagger end joints.
 - b. Planks must be supported by bent plates (steel or other support) at all transitions of the roof. This includes but is not limited to the ridge, valleys, perimeter and plank direction change. Planks must have a minimum of 1 inch bearing and should be glued and screwed at these transitions.
 - c. Plank ends must fall over structural supports and have a minimum of 1 inch bearing.
2. Secure planks to joists with screws and spacing as indicated.
3. Do not allow foot traffic on planks until after screws are installed.
4. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.
5. Cut plank neatly to abut parapets, around openings and penetrations.
6. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.

3.4 CLEANING

- A. Clean exposed surfaces of all deck surfaces.
- B. Remove and replace work that cannot be successfully repaired to permanently eliminate evidence of structural damage.

3.5 PROTECTION

- A. Protect installed work from damage due to weather related moisture.
- B. Protect installed work from damage due to subsequent construction activity on site so that the work will be without damage and deterioration at time of acceptance by the Owner.

END OF SECTION 03 51 163

SECTION 03 52 16 - LIGHTWEIGHT INSULATING 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:
 - 1. Cast-in-place cellular foam lightweight insulating concrete.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For lightweight insulating concrete.
 - 1. Include plans, sections, and details showing roof slopes, thicknesses, and embedded insulation board.
 - 2. Indicate locations of penetrations, perimeter terminations and curbs, control and expansion joints, and drains.
 - 3. Indicate average R-value for the entire roof.
- C. Design Mixtures: For each lightweight insulating concrete mixture.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For NRDCA Installer.
- B. Product Certificates: For the following:
 - 1. Cementitious materials.
 - 2. Foaming agents.
 - 3. Admixtures.
 - 4. Molded-polystyrene insulation board.
- C. Evaluation Reports: For lightweight insulating concrete, from ICC-ES.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Warranty: Provide Manufacturer's Roof Insulation Systems Performance Warranty
 - 1. Term of Warranty: 20 years.

1.7 FIELD CONDITIONS

- A. Do not place lightweight insulating concrete unless ambient temperature is at least 40 deg F and rising.
- B. Do not place lightweight insulating concrete during rain or snow or on surfaces covered with standing water, snow, or ice.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- B. Thermal Resistance:
 - 1. Provide installation with minimum R-20 average thermal resistance

2.2 CELLULAR LIGHTWEIGHT INSULATING CONCRETE

- A. Produce cellular lightweight insulating concrete with the following minimum physical properties using cementitious materials, air-producing liquid-foaming agents complying with ASTM C 869/C 869M, and the minimum amount of water necessary to produce a workable mix:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Celcore Incorporated.
 - 2. Elastizell Corporation of America.
 - 3. Siplast, Inc.
 - 4. As-Cast Unit Weight: 34 to 42 lb/cu. ft. at point of placement, when tested according to ASTM C 138/C 138M.
 - 5. Oven-Dry Unit Weight: 26 to 32 lb/cu. ft., when tested according to ASTM C 495.
 - 6. Compressive Strength: Minimum 190 psi, when tested according to ASTM C 495.

2.3 MATERIALS

- A. Cementitious Material: Portland cement, ASTM C 150/C 150M, Type I, II, or III..
- B. Water: Clean, potable.
- C. Joint Filler: ASTM C 612, Class 2, glass-fiber type; compressing to one-half thickness under a load of 25 psi.
- D. Molded-Polystyrene Insulation Board: ASTM C 578, Type I, 0.90-lb/cu. ft. minimum density.
 - 1. Provide units with manufacturer's standard keying slots or holes of 3 to 4 percent of board's gross surface area.

2.4 DESIGN MIXTURES

- A. Prepare design mixtures for each type and strength of lightweight insulating concrete by laboratory trial batch method or by field-test data method. For trial batch method, use a qualified independent testing agency for preparing and reporting proposed mixture designs.
- B. Limit water-soluble chloride ions to the maximum percentage by weight of cement or cementitious material permitted by ACI 301.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Control Joints: Install control joints at perimeter of roof deck and at junctures with vertical surfaces, including curbs, walls, and vents, for full depth of lightweight insulating concrete. Fill control joints with joint filler.
 - 1. Provide 1-inch- wide control joints for roof dimensions up to 100 feet in length; 1-1/2-inch- wide control joints for roof dimensions exceeding 100 feet.

3.2 MIXING AND PLACING

- A. Mix and place lightweight insulating concrete according to manufacturer's written instructions, using equipment and procedures to avoid segregation of mixture and loss of air content.
- B. Install insulation board according to lightweight insulating concrete manufacturer's written instructions. Place insulation board in wet, lightweight insulating concrete slurry poured a minimum of 1/8 inch over the structural substrate. Ensure full contact of insulation board with slurry. Stagger joints and tightly butt insulation boards. Allow slurry coat to set prior to placing remaining thickness of lightweight insulating concrete.
 - 1. Install insulation board in a stair-step configuration with a maximum step-down of 1 inch.

- C. Deposit and screed lightweight insulating concrete in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Place to depths and slopes indicated.
- D. Finish top surface smooth, free of ridges and depressions, and maintain surface in condition to receive subsequent roofing system.
- E. Begin curing operations immediately after placement, and air cure for not less than three days, according to manufacturer's written instructions.
- F. If ambient temperature falls below 32 deg F, protect lightweight insulating concrete from freezing and maintain temperature recommended by manufacturer for 72 hours after placement.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to sample materials and perform tests and inspections.
- B. Testing of samples of lightweight insulating concrete obtained according to ASTM C 172/C 172M, except as modified by ASTM C 495, shall be performed according to the following requirements:
 - 1. Determine as-cast unit weight during each hour of placement, according to ASTM C 138/C 138M.
 - 2. Determine oven-dry unit weight and compressive strength according to ASTM C 495. Make a set of at least six molds for each day's placement, but not less than one set of molds for each 5000 sq. ft. of roof area.
 - 3. Perform additional tests when test results indicate that as-cast unit weight, oven-dry unit weight, compressive strength, or other requirements have not been met.
 - a. Retest cast-in-place lightweight insulating concrete for oven-dry unit weight and compressive strength.
- C. Prepare test and inspection reports.

END OF SECTION 03 52 16

SECTION 03 62 00 - NONSHRINKING GROUT

PART 1 - GENERAL

1.1 SCOPE:

Under this heading shall be included the furnishing and installation of non-shrink grouts. Non-shrink grouts shall be used for the following types of work: setting handrails; setting or joining precast concrete elements; and for patching and repair of all watertight structures. Non-shrink grout shall also be used for patching and repair of precast and/or prestressed concrete work and other grouting work where specifically noted on the Contract Plans.

Included is all labor, materials, equipment, tools, and energy necessary to accomplish the grouting work.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS:

- a) Patching and repair of concrete surfaces, where non-shrink grout is not specified nor noted on the Contract Plans, is included under Cast-in-Place Concrete, Section 03 30 00.
- b) Repair of concrete work by bonding, adhesion and pressure injection, and anchoring of anchor bolts and dowels subject to dynamic, vibratory or impact type of loading is included under Epoxy Grout, Section 03 63 00.
- c) Grouting and re-pointing of masonry joints is included under Mortar, Section 04 05 00.

PART 2 - PRODUCTS

2.1 MATERIALS:

- a) Non-Shrink/Non-Metallic Grout (Type "A").

Grout shall be factory mixed containing natural aggregates formulated to be used at any consistency from extremely fluid to damp pack (Plastic). The grout shall be similar in finished appearance to adjacent concrete or mortar. The grout shall be free of gas producing agents, oxidizing catalysts, and inorganic accelerators.

The compressive strength of the grout in-place, when placed in a plastic consistency, shall meet or exceed the following:

- 4,000 psi at 1 Day
- 6,000 psi at 3 Days
- 7,500 psi at 7 Days
- 9,500 psi at 28 Days

Grout placed in a fluid consistency shall meet or exceed an in-place 28-day compressive strength of at least 15 percent greater than the required concrete strength specified, or 5,000 psi, which ever is greater.

The following products (or equal to) are acceptable for Type "A" grout:

- 1) SonogROUT, by Sonneborn-Contech, Minneapolis, Minnesota (612/835-3434).

- 2) 588 Grout, by W. R. Meadows of Georgia, Atlanta, Georgia (404/691-5358).
- 3) UPCON High Flow Grout, by UPCO Div., Emhart Chemical Group, Cleveland, Ohio (216/881-0033).

b) Water.

Water shall be potable.

PART 3 - EXECUTION

3.1 GROUTING SCHEDULE:

Grouting under this Contract shall be done in accordance with the applicable items in the following schedule, unless noted otherwise:

<u>Grouting Applications</u>	<u>Grout Type*</u>
Concrete surface repair and patch work	"A"
Metal handrails	"A"
Setting and joining precast concrete elements	"A"

* Type "A" grout shall be used for all applications where grout will be exposed to saltwater, brackish water, saltwater spray or corrosive environment.

3.2 GROUT CONSISTENCY:

Grout may be placed in a damp pack (plastic) or flowable (fluid) consistency to suit job conditions and as specified herein; however, grout shall be placed in a damp pack (plastic) consistency wherever possible to provide the highest strength grout.

Damp pack (plastic) grout shall be used for grouting vertical surfaces with holes having at least one surface dimension less than the hole depth and for holes left by removal of fasteners and form ties. Damp pack (plastic) grout may be used for precast concrete elements where either horizontal dimension of the element being grouted is less than 16 inches.

Flowable or fluid grout shall be used for all other applications.

3.3 SURFACE PREPARATION:

a) General.

Concrete surfaces to receive grout shall be rough and reasonably level. Laitance shall be removed to sound concrete. The surfaces, including bolt holes shall be saturated with water for 24 hours prior to grouting, unless otherwise recommended by the grouting manufacturer.

Where grout is to be used to repair damaged concrete surfaces, the damaged or honeycombed concrete shall be removed to sound concrete by chipping.

Metal surfaces to receive grout shall be de-rusted, cleaned of oil, grease, and other deleterious substances by means of appropriate solvents, wire brushing or a combination of both.

b) Formwork.

Forms shall be provided for grout placed at a flowable (fluid) consistency.

Forms shall be strong, tight and shall be braced so they will not leak or buckle under the weight of fluid grout. On the placing side, forms shall extend 3 inches from base plate, unless otherwise indicated, and shall slant at a 45-degree angle. Grout shall be poured directly on the slanted face. On other sides, the form shall be placed 1/2-inch or more away from base of the bedplate and 1-inch or higher than the underside of the plate.

Forms shall be caulked with grout or a sand-cement mortar to prevent leakage. Expanded polystyrene or other means shall be used to caulk between foundation and portions of the element being grouted to seal off areas where grout is not required.

Provide air relief openings to avoid entrapment of air.

3.4 GROUT PREPARATION, PLACEMENT AND CURING:

Grout shall be mixed to proper consistency, placed, and cured as instructed by the grout manufacturer. A paddle type mortar mixer or other suitable mechanical mixer shall be used unless otherwise allowed.

Any nearby vibrating machinery or equipment should be shut down to avoid disturbing the bonding or initial set of freshly placed grout.

Mixing water temperature shall not be less than 40 Degrees F. nor exceed 80 degrees F. unless more stringent conditions are required by the grout manufacturer.

Grout shall be placed at a temperature of 65 to 75 Degrees; and maintained at this temperature range for 24 hours and above 40 Degrees F. thereafter until the grout strength exceeds 4,000 psi.

Grout used for concrete surface repair and patchwork shall be applied to a small area and allowed to cure to determine color compatibility (subject to Design Professional's review).

3.5 MEASUREMENT AND PAYMENT:

Measurement and payment for work under this section shall be included in overall project lump sum amount unless otherwise specified in Section 01 22 00.

END OF SECTION 03 62 00.

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SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Concrete masonry units (CMUs).
2. Face brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry-joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Cavity wall Insulation.
10. Masonry-cell fill.

- B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.

- C. Related Requirements:

1. Section 05 50 00 "Metal Fabrications" for Steel lintels and shelf angles for unit masonry.
2. Section 05 12 00 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.

1.3 DEFINITIONS

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

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 1. Comply with Requirements in 01 31 00 "Project Management and Coordination."
 2. Locations and installation of brick expansion joints and CMU control joints will be included on the agenda.

1.5 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. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
 - 1. Face brick, in the form of straps of five or more bricks.
 - 2. Colored mortar.
 - 3. Weep holes/cavity vents.
- D. Samples for Verification: For each type and color of the following:
 - 1. Exposed CMUs.
 - 2. Face brick, in the form of straps of five or more bricks.
 - 3. Special brick shapes.
 - 4. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
 - 5. Weep holes and cavity vents.
 - 6. Accessories embedded in masonry.

1.6 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 Design Professional and approved in writing.
- B. Qualification Data: For testing agency.
- C. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include 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.
 - d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing 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.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockup of typical wall area.
 - a. Include a sealant-filled joint at least 16 inches long in each exterior wall mockup.
 - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
 - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 2. Clean exposed faces of mockups with masonry cleaner as indicated.
 3. Protect accepted mockups from the elements with weather-resistant membrane.
 4. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Design Professional in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Design Professional specifically approves such deviations in writing.

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

- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. 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.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 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 and will be within 20 feet vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

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. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
 - 2. Density Classification: Lightweight] unless otherwise indicated.
 - 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.4 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.5 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.
 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick: Facing brick complying with ASTM C 216.
1. Provide brick products by Cherokee Brick & Tile or matching products by one of the following:
 - a. Boral Bricks.
 - b. Carolina Ceramics Brick Company.
 - c. Palmetto Brick.
 - d. Pine Hill Brick.
 - e. Richtex.
 2. Grade: MW or SW.
 3. Type: FBS.
 4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
 5. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
 6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 7. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet
 8. Size (Actual Dimensions): 3-5/8 inches wide by 3-5/8 inches high by 11-5/8 inches long.
 9. Application: Use where brick is exposed unless otherwise indicated.
 10. Color and Texture: Match Design Professional's samples.
 - a. Face Brick 1 (Field): M/S Match existing building.

2.6 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.
- D. Masonry Cement: ASTM C 91/C 91M.
 - 1.
- E. Mortar Cement: ASTM C 1329/C 1329M.
- F. Colored Cement Products: Packaged blend made from portland cement and hydrated lime] or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 1. Colored Portland Cement-Lime Mix:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Capital Materials Corparation; Riverton portland cement lime custom color.
 - 2) Holcim (US) Inc; Rainbow Mortamix Custom Color Cement/Lime.
 - 3) Lafarge North America Inc.; Eaglebond Portland & Lime.
 - 4) Lehigh Hanson; HeidelbergCement Group; Lehigh Custom Color Portland/Lime Cement.
 - 2. Colored Masonry Cement:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Holcim (US) Inc; Rainbow Mortamix Custom Color Mortar Cement.
 - 2) Cemex S.A.B. de C.V.; Mortar Cement.
 - 3) Lafarge North America Inc; Magnolia Super Mortar Cement.
 - 3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 4. Pigments shall not exceed 10 percent of portland cement by weight.
 - 5. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
- G. 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. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- H. Aggregate for Grout: ASTM C 404.
- I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Addiment Incorporated; Mortar Kick.
- b. Euclid Chemical Company (The); an RPM company; Accelguard 80.
- c. Grace Construction Products; W.R. Grace & Co. -- Conn.; Morset.
- d. Sonneborn, Div of ChemRex; Trimix-NCA.

J. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Dur-O-Wal; a Hohmann & Barnard company.
- b. Heckmann Building Products, Inc.
- c. Hohmann & Barnard, Inc.
- d. Wire-Bond.

C. 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.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

E. Masonry-Joint Reinforcement for Multiwythe Masonry:

1. Tab type, either ladder or truss design, with one side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe, but with at least 5/8-inch cover on outside face.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least halfway 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. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
1. Where wythes do not align, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
 2. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire.
- 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.
- 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 0.105-inch- thick steel sheet, galvanized after fabrication.
- 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.
- G. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch- thick steel sheet, galvanized after fabrication.
 3. Fabricate wire ties from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 4. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
 5. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) FERO Corporation.
 - 2) Hohmann & Barnard, Inc.
 6. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Heckmann Building Products, Inc.

- 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.
7. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Heckmann Building Products, Inc.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.
8. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting wire tie. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs.
- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Hohmann & Barnard, Inc.
 - 2) Wire-Bond.
9. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Heckmann Building Products, Inc.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.

2.9 MISCELLANEOUS ANCHORS

- A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.
- B. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- C. Postinstalled Anchors: Provide chemical anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and

equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Corrosion Protection, Interior: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).
2. Corrosion Protection, Exterior and where Stainless Steel is Indicated: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2.10 EMBEDDED FLASHING MATERIALS

- A. General: Provide prefabricated corners and end dams of same material and thickness as primary material and form the same flashing manufacturer.
- B. Provide minimum 10-inch wide strips of same material under joints.
- C. Metal Flashing: Provide metal flashing complying with SMACNA's " Architectural Sheet Metal Manual" and as follows:
 1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch thick.
 - a. At counter flashing **receivers above standing seam metal roof-to-wall conditions.**
 2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
 4. Fabricate **through-wall** counter flashing receiver with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees.
 5. Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam sheds water.
 6. Provide manufacture's standard accessories including preformed corners and end dams.
- D. Flexible Flashing: Use the following unless otherwise indicated:
 1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. **Products:** Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
 - 2) AFCO Products Inc.; Copper Fabric Flashing.
 - 3) Hohmann & Barnard, Inc; C-Fab.
 - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
 - 5) Polytite Manufacturing Corp.; Copper Fabric Flashing.
 - 6) Sandell Manufacturing Co.; Copper Fabric Flashing.
 - 7) York Manufacturing, Inc; Copper Fabric Flashing.
- E. 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.
 4. Where flashing is fully concealed, use flexible flashing.
- F. 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.
- G. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch.

2.11 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 or PVC, complying with ASTM D 2287, Type PVC-65406 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 one of the following unless otherwise indicated:
1. Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity. Use only for weeps.
 2. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.
 - a. **Products:** Subject to compliance with requirements, provide one of the following:
 - 1) Heckmann Building Products, Inc.; #330 with Stainless Screen & Wick.
 - 2) Hohmann & Barnard, Inc; #341S - Stainless Steel Screen.
 - 3) Wire-Bond; #3600C.
 3. 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. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) Advanced Building Products Inc.
 - 2) Heckmann Building Products, Inc.
 - 3) Hohmann & Barnard, Inc.
 - 4) Wire-Bond.
 1. Application: Unless otherwise indicated, use the following:
 - a. Where indicated at the base of the structure, use Cellular Plastic weep/vent.

- b. Where indicated other than the base of the structure, use round plastic weep/vent Tubing.
 - c. Where weep is fully concealed or above 12'-0" above finished floor, use wicking material.
- 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; Mortar Break II.
 - b. Mortar Net USA, Ltd; Mortar Net.
 - c. Wire-Bond; Cavity Net; Cavity Net II.
 - 2. Configuration: Provide one of the following:
 - a. Strips, not less than 3/4 inch or 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.
 - 1) Provide 3/4 inch material for 1 to 1-3/4 inch air space.
 - 2) Provide 1-1/2 inch material for 2 inch air space.
 - b. Sheets or strips, full depth of cavity and installed to full height of cavity where indicated.

2.12 POLYISOCYANURATE FOAM-PLASTIC BOARD

- A. Polyisocyanurate Board, Foil Faced: ASTM C 1289, foil faced, Type I, Class 1 or 2.
- 1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - 2. Shiplap edges or tongue and groove edges, as standard with manufacture
 - 3. 1.5" thickness
 - 4. R=10
 - 5. Products: Subject to compliance with requirements, provide one of the following:
 - a. Atlas Roofing Corporation
 - b. Dow Chemical Company (The)
 - c. Firestone Building Products
 - d. Hunter Panels
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.13 MASONRY-CELL FILL

- A. Loose-Fill Insulation: Perlite complying with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

2.14 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of 1/2-cup dry measure tetrasodium poluphosphate and 1/2-cup dry measure laundry detergent dissolved in 1 gal. of water.

- B. 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:
 - a. Diedrich Technologies, Inc.; a division of Sandell Construction Solutions.
 - b. EaCo Chem, Inc.
 - c. PROSOCO, Inc.
- C. Provide Brick Manufactures written authorization of brick cleaners compatibility with masonry installed product.

2.15 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 masonry cement or mortar cement mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime masonry cement or mortar cement mortar.
 4. For reinforced masonry, use portland cement-lime] masonry cement or mortar cement mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- 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 or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S or Type N.
 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. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Mix to match Design Professional's sample.

2. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:
 - a. Face brick.

- E. 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, Table 1.
 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. 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. Comply with construction tolerances in ACI 530.1/ASCE 6/ TMS 602 and with the following:

- B. 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.

- C. 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.

- D. 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.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

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 07 84 43 "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.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- E. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, and air barriers unless otherwise indicated.

3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
 - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 36 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
 - a. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.
 - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) ties to allow for differential movement regardless of whether bed joints align.
 - 2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use tab-type reinforcement.
 - 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.
 - 3. Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not more than 12 inches clear horizontally and 16 inches clear vertically.
 - 4. 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.
2. Install insulation with foil face to exterior.

3.7 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
1. Fasten screw-attached anchors with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 2. Embed tie sections in masonry joints.
 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.
- B. Provide not less than 1 inch of airspace between back of masonry veneer and face of insulation.
1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.8 MASONRY-CELL FILL

- A. Pour loose-fill insulation into cavities where indicated on drawings to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet.

3.9 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 in addition to continuous reinforcement.
- 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.

3.10 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.

3.11 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 using one of the following methods:
 - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
- C. Form expansion joints in brick as follows:
 - 1. Build in compressible joint fillers where indicated.
 - 2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 07 92 00 "Joint Sealants."
- D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than 3/8 inch.
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.12 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.13 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 multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. Form 1/4-inch hook in edge of flashing embedded in inner wythe.]
 - 3. 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 air barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.
 - 4. 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.
 - 5. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
 - 6. At base only of masonry walls **above metal roof-to-wall conditions**, install stainless steel flashing with integral ribs.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. 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. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
 - 3. Space weep holes formed from plastic tubing or wicking material 16 inches o.c.
 - 4. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
 - 5. Trim wicking material flush with outside face of wall after mortar has set.
- E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- F. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.
 - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.14 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. 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.

3.15 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.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- D. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- E. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.16 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 Design Professional'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.
 - 7. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.17 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.
- B. Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00

SECTION 05 12 00 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Work:
 - Miscellaneous Metal
 - Steel Joists

1.2 WORK INCLUDED

- A. The extent of structural steel work is shown on the drawings, including schedules, notes and details to show size and location of members, typical connections and type of steel.
- B. Approval by the Owner or his representative of shop drawings prepared by the fabricator indicates the fabricator has correctly interpreted the contract requirements. Approval does not relieve the fabricator of the responsibility for accuracy of detailed dimensions on shop drawings nor the general fit-up of parts to be assembled in the field.

1.3 SUMMARY

- A. This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.
- B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
- C. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
- D. Refer to Division 3 for anchor rod installation in concrete, Division 4 for anchor rod installation in masonry.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 - 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
 - 2. High-strength bolts (each type), including nuts and washers.

3. Direct Tension Indicators if used.
 4. Unfinished bolts and nuts.
 5. Structural steel primer paint.
 6. Shrinkage-resistant grout.
- C. Shop drawings prepared under supervision of a licensed Structural Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.
 2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.
 3. Submit shop drawings including complete details and schedule for fabrication and shop assembly of members, and details, schedules, procedures and diagrams, showing the sequence of erection.
 4. Contractor shall check, approve and stamp all shop drawings prior to submittals to Architect.
 5. The shop drawings shall be reviewed by Architect prior to fabrication. Architect's review is for design only. Contractor is responsible for dimensions, quantities, and coordination with other trades. Engineer's review and acceptance of shop drawings is subject to all contract requirements and does not authorize any changes involving additional cost to Owner.
 6. Include details of cuts, connections, splices, camber and holes. Indicate welds by standard AWS symbols, and show size, length and type of each weld.
 7. Provide setting drawings, templates, and directions for the installation of anchor bolts and anchorages to be installed by others.
 8. Shop drawings shall be made to conform to the design drawings. Contract drawings shall take precedence over Shop Drawings.
 9. Shop drawings that include elements designed by the fabricator shall be signed and sealed by a professional engineer licensed in the State of Georgia.
- D. Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.
- E. For each approved fabricator that is exempt from special inspections of shop fabrications and implementation procedures in accordance with Section 1704.2.5.2 of IBC 2012, the Contractor shall submit "Fabricator's Certificate of Compliance". Contractor shall also provide copies of fabricator's certification or building code evaluation services report and fabricator's quality control manual.

1.5 QUALITY ASSURANCE

- A. Codes and Standards:
1. Comply with provisions of following, except as otherwise indicated:
 2. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges."
 3. AISC "Specifications for Structural Steel Buildings," including "Commentary."
 4. AISC "Specification for Structural Joints using High-Strength Bolts".
 5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."
 6. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."
- B. Fabrication and Erection Qualifications:
1. Fabricator and erector must have a minimum of five years experience with a proven record of satisfactory work.

2. Fabricator and erector must have had work of similar type of construction to be considered as "satisfactory work".
 3. Fabricators must meet requirements set forth in Section 1704.2.5 of IBC 2012 except Fabricators who are exempt based on participation in the AISC Quality Certification Program and are designated an AISC-Certified Plant, Category Sbd.
 4. The Architect shall be the sole judge as to whether the fabricator and erector satisfactorily meets these requirements.
 5. "Steel Fabricator" and "Steel Erector" shall be an organized steel company engaged in this type of work.
 6. If any fabricator or steel erector is doubtful as to whether he meets these requirements, he may submit information to the Architect at least 10 days before the bid opening in order to qualify.
- C. Qualifications for Welding Work:
1. Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.
 2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within the previous 12 months.
 3. If recertification of welders is required, retesting will be Contractor's responsibility and shall be at no cost to the Owner.
- D. Source Quality Control:
1. Materials and fabrication procedures are subject to inspection and tests in the mill, shop and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 2. Remove and replace materials or fabricated components which do not comply.
- E. Design of Members and Connections:
1. All details are typical; similar details apply to similar conditions, unless otherwise indicated on the drawings. Verify dimensions at the site without causing delay in the work.
 2. Notify the Architect whenever design of members and connections for any portion of the structures is not indicated on the drawings or specified herein.
- F. Land Surveyor Qualifications:
1. A Professional Land Surveyor who is legally qualified to practice in jurisdiction where project is located and with a minimum of five years in providing surveying services of the kind indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.
- D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.
- B. Structural Steel Wide Flange Shapes: ASTM A992 Grade 50.
- C. Other Structural Steel Shapes, Plates, and Bars: ASTM A36.
- D. Cold-Formed Steel Tubing: ASTM A500, Grade B, Grade 46.
- E. Steel Castings: ASTM A27, Grade 65-35, medium-strength carbon steel.
- F. Anchor Rods: ASTM F1554, headed type, grade 36, unless otherwise indicated.
- G. Unfinished Threaded Fasteners:
 - 1. ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.
 - 2. Provide either hexagonal or square heads and nuts, except use only hexagonal units for exposed connections.
- H. High-Strength Threaded Fasteners:
 - 1. Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
 - 2. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A 325 or A 490.
 - 3. Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B 695, Class 50, or hot-dip galvanized complying with ASTM A 153.
 - 4. Twist-off type tension-control bolt assemblies complying with ASTM F1852.
- I. Direct Tension Indicators:
 - 1. ASTM F 959, type as required.
 - 2. Use on all A325 and A490 bolts.
- J. Electrodes for Welding: Comply with AWS Code.
- K. Structural Steel Primer Paint: SSPC - Paint 11.
- L. Nonmetallic Shrinkage-Resistant Grout:
 - 1. Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

2.2 FABRICATION

- A. Shop Fabrication and Assembly:
1. Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide parabolic camber in structural members where indicated.
 2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
- B. Connections:
1. Weld or bolt shop connections, as indicated.
 2. Provide high-strength threaded fasteners for all principal bolted connections, except unfinished bolts may be used for temporary bracing to facilitate erection. Bolts through 4" wide beam flanges shall be 5/8" diameter. Other bolts shall be 3/4" diameter.
 3. Unless indicated or detailed otherwise on plans, all connections shall be detailed and designed by the fabricator under the direct supervision of a Professional Engineer, registered in the State of Georgia. Connections shall be designed as unrestrained flexible connections described as simple connections under Section B3 of the AISC Specifications for Structural Steel Buildings.
 4. Except where otherwise detailed or specified on the contract drawings, all framed connections shall be detailed and designed by the fabricator in accordance with Part 9 of the AISC Manual of Steel Construction. Framed beam connections shall be capable of transmitting a minimum of fifty percent of total capacity of beam determined from the tables in Part 3 of AISC Manual of Steel Construction for shape and span unless otherwise noted on the drawings.
 5. Design calculations for the connections designed by the contractor shall be submitted for the files of the architect. Calculations shall bear the seal of a Professional Engineer registered in the State of Georgia. Shop drawings containing connections for which calculations have not been received will be returned unchecked as incomplete submittals.
 6. Connections shall be detailed and designed with provisions for eccentricities. Minimum connection capacity to be 10 kips unless otherwise noted on the drawings.
- C. Bolt field connections, except where welded connections or other connections are indicated.
1. Provide high-strength threaded fasteners for all bolted connections.
 2. Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts, and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.
 3. All bolted connections shall be pretensioned.
- D. High-Strength Bolted Construction:
1. Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts."
 2. All bolts shall have a hardened washer under the turning element.
 3. Installation of direct tension indicator washers or direct tension indicator bolt systems shall be in accordance with manufacturer's instructions.
- E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
- F. Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.
- G. Expansion Joints: Provide expansion joints in steel shelf angles when part of structural steel frame; locate at vertical brick expansion joints as indicated on drawings.

H. Cooperation with Other Trades:

1. Provide holes for securing other work to structural steel framing, and for the passage of other work through steel framing members, as shown on the final shop drawings. Provide threaded nut welded to framing, and other specialty items as shown to receive other work.
2. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
3. All loose plates, bolts and inserts between the structural steel and work of other trades are to be furnished by the fabricator and set by other trades.
4. All loose lintels to be furnished by the fabricator and set by other trades.

2.3 SHOP PAINTING

A. General:

1. Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.
2. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
3. Do not paint surfaces scheduled to receive sprayed-on fireproofing.
4. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted.

Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. SP-1 "Solvent Cleaning."
2. SP-2 "Hand-Tool Cleaning."
3. SP-3 "Power-Tool Cleaning."
4. SP-6 "Commercial Blast Cleaning."
5. SP-7 "Brush-Off Blast Cleaning."

C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 2.0 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.

D. Painting: Provide a two-coat, shop-applied paint system complying with Steel Structures Painting Council (SSPC) Paint System Guide No. 7.00.

2.4 SOURCE QUALITY CONTROL

A. General:

1. Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Testing agency will perform at least one shop inspection at the start of fabrication to verify the fabricators quality assurance and quality control procedures, and qualification for exemption from shop inspections required by IBC 2012 Chapter 17. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
2. Promptly remove and replace materials or fabricated components that do not comply.

B. Design of Members and Connections:

1. Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

2. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 - EXECUTION

3.1 ERECTION

A. General:

1. Comply with AISC Specifications, AISC Code of Standard Practice, OSHA requirements, and as herein specified.
2. All steel framing shall be considered non-self-supporting steel frames as defined by Article 7.9.3 of the AISC Code of Standard Practice dated September 1, 1986.
3. Contractor shall provide all necessary temporary support until required connections or other interacting elements are complete, including all diaphragms, horizontal bracing, moment frames, braced frames, and shear walls.

B. Surveys:

1. Before erection begins, survey elevations and plan locations of concrete and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with Erector present, for compliance with requirements and specified tolerances.
 - a. Engage land surveyor to perform surveying.
 - b. Survey submittals shall indicate elevations and plan locations, and discrepancies between actual installation and Contract Documents.
 - c. Connections to surveyed items cannot be made until submittal has been approved by Design Professional and unsatisfactory conditions have been corrected.

C. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

D. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

E. Setting Base Plates and Bearing Plates:

1. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
2. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
3. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
4. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
5. For proprietary grout materials, comply with manufacturer's instructions.

F. Field Assembly:

1. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

2. Level and plumb individual members of structure within specified AISC tolerances.
 3. Splice members only where indicated and accepted on shop drawings.
- G. Erection Bolts:
1. On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.
 2. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 3. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- H. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- I. Touch-Up Painting:
1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
 2. Apply by brush or spray to provide minimum dry film thickness of 2.0 mils.

3.2 QUALITY CONTROL

- A. Engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
- B. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- D. Testing agency may inspect structural steel at plant before shipment.
- E. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.
- F. Shop-Bolted Connections:
1. Inspect or test in accordance with AISC specifications.
 2. Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F 959, Table 2.
- G. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. Perform visual inspection of all welds.
 3. Perform tests of tension and moment resisting welds using one of the following procedures:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
 - c. Radiographic Inspection: ASTM E 94; minimum quality level "2-2T."
 - d. Ultrasonic Inspection: ASTM E 164.

- H. Field-Bolted Connections:
 - 1. Inspect in accordance with AISC specifications.
 - 2. For Direct Tension Indicators, comply with requirements of ASTM F 959. Verify that gaps are less than gaps specified in Table 2.

- I. Field Welding: Inspect and test during erection of structural steel as follows:
 - 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Perform visual inspection of all welds.
 - 3. Perform tests of tension and moment resisting welds using one of the following procedures:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
 - c. Radiographic Inspection: ASTM E 94; minimum quality level "2-2T."
 - d. Ultrasonic Inspection: ASTM E 164.

END OF SECTION 05 12 00

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SECTION 05 22 00 - STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Work:
 - Structural Steel
 - Miscellaneous Metal

1.2 WORK INCLUDED

The extent of steel joists is shown on the drawings, including basic layout and type of joists.

1.3 SUMMARY

- A. This Section includes steel joists and joist girders for floor and roof framing. Types of joists required include the following:
 - 1. K-Series Open Web Steel Joists.
 - 2. LH-Series Longspan Steel Joists.
- B. Refer to Division 3 Sections for installation of anchors set in concrete.
- C. Refer to Division 4 Sections for installation of anchors set in masonry.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data and installation instructions for each type of joist and accessories.
 - 1. Include manufacturer's certification that joists comply with SJI "Specifications."
- C. Shop Drawings, Steel Joists:
 - 1. Submit detailed drawings showing layout of joist units, special connections, jointing and accessories. Include the mark, number, type, location and spacing of joists and bridging.
 - 2. Shop drawings shall be submitted by the Contractor to the Architect and review action received prior to fabrication. When corrections are required, copies shall be returned noting such corrections.
 - 3. The Contractor shall be responsible for the checking of quantities and dimensions. Contract drawings receive precedence over shop drawings unless authorized otherwise in writing.
 - 4. All connections including those made in the field shall be shown and detailed. Provide templates or location drawing for installation of anchor bolts.

5. Shop drawings that include elements designed by the fabricator must be signed and sealed by professional engineer licensed in the State of Georgia. As an alternate, Design Professional shall require a signed and sealed cover letter with the shop drawings substantiating the design information. The design engineer must review and confirm in writing that the shop and erection drawings properly incorporate their design.
6. Furnish complete design analysis of all joists with shop drawings.

1.5 QUALITY ASSURANCE

- A. General: Provide joists fabricated in compliance with Steel Joist Institute (SJI) "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Quality of Fabricators:
 1. A firm experienced in fabricating joists similar to those indicated for this Project and with a record of successful in-service performance.
 2. Fabricator must be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.
 3. Fabricator assumes responsibility for engineering special joists to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensible engineering analysis by a qualified professional engineer.
- C. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with American Welding Society (AWS) "Structural Welding Code - Steel," AWS D1.1.
- D. Inspection: Inspect joists and girders in accordance with SJI "Specifications."

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle steel joists as recommended in SJI "Specifications." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel: Comply with SJI "Specifications" for chord and web sections.
- B. Steel Bearing Plates: ASTM A 36.
- C. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular hexagon type, low carbon steel.
- D. Steel Prime Paint: Comply with SJI "Specifications."

2.2 FABRICATION

- A. General: Fabricate steel joists in accordance with SJI "Specification." All joists shall be designed by the joist manufacturer to support the total load-carrying capacity shown in the

Steel Joist Institute tables for the joist depth, chord designations, and span length indicated on the contract drawings.

- B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
- C. Extended End: Provide extended ends on joists where indicated, complying with SJI "Specifications" and load tables.
- D. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.
- E. Top Chord Extension: Provide top chord extensions on joists where indicated, complying with SJI "Specifications" and load tables.
- F. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with SJI "Specifications."
 - 1. Provide bridging anchors for ends of bridging lines terminating at walls or beams.
- G. End Anchorage: Provide end anchorages, including steel bearing plates, to secure joists to adjacent construction, complying with SJI "Specifications."
- H. Header Units: Provide header units to support tail joists at openings in floor or roof system not framed with steel shapes.
- I. Shop Painting: Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint.
 - 1. Apply one shop coat of steel prime paint to joists and accessories, by spraying, dipping, or other method to provide a continuous dry paint film thickness of not less than 0.50 mil.
- J. Sloped Joists: Where roof joists slopes exceed 1/2" in 1'-0", joist manufacturer shall increase member sizes to include effects of increase and/or decrease in member loads and spans.
- K. Lateral Support:
 - 1. Joists shall be designed to receive lateral bracing only at locations and spacings specified for deck fasteners or for angle, channel bulb tee or other steel purlins or sub-purlins.
- L. Joists supporting roofs shall be designed for a net wind uplift calculated in accordance with the Contract Documents. Provide additional lines of bridging as required by joist manufacturer.

PART 3 - EXECUTION

3.1 ERECTION

- A. Place and secure steel joists in accordance with SJI "Specifications," final shop drawings, and as herein specified.

- B. Anchors: Furnish anchor bolts, steel bearing plates, and other devices to be built into concrete and masonry construction.
 - 1. Provide unfinished threaded fasteners for anchor bolts, unless high strength bolts indicated.
- C. Placing Joists: Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.
- D. Provide temporary bridging, connections, and anchors to ensure lateral stability during construction. Where "open-web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.
- E. Bridging: Install bridging simultaneously with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams. No pipes, ducts, conduits or any other mechanical or electrical component shall be suspended from joist bridging.
- F. Fastening Joists: Comply with the following:
 - 1. Field weld joists to supporting steel framework and steel bearing plates where indicated in accordance with SJI "Specifications" for type of joists used. Coordinate welding sequence and procedure with placing of joists.
- G. Touch-Up Painting: After joist installation, wire brush welded areas, abraded or rusty surfaces, and clean with solvent. Paint field-applied bolt heads and nuts and prepared surfaces on joists and steel supporting members. Use same type of paint as used for shop painting.
- H. Mechanical Supports:
 - 1. To hang or bear equipment on the joists, all equipment loads shall be applied within 4" of a panel point at chord level with application equally divided between chord members.
 - 2. When load is over 4" from panel point, joist manufacturer shall provide additional reinforcement for load imposed.
 - 3. Contractor shall be responsible to provide joist manufacturer with location and magnitude of concentrated loads due to equipment. Joist manufacturer to indicate location loads and reinforcement on shop drawings.

END OF SECTION 05 22 00

SECTION 05 31 00 - STEEL DECK

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. This Section includes steel deck units for roof applications.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Product data including manufacturer's specifications and installation instructions for each type of decking and accessories.
 - a. Provide test data for mechanical fasteners used in lieu of welding for fastening deck to supporting structures.
 - 2. Shop drawings showing layout and types of deck units, anchorage details, and conditions requiring closure strips, supplementary framing, sump pans, cant strips, cut openings, special jointing, and other accessories.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated:
 - 1. American Iron and Steel Institute (AISI), "Specification for the Design of Cold-Formed Steel Structural Members."
 - 2. American Welding Society (AWS), D1.3 "Structural Welding Code - Sheet Steel."
 - 3. Steel Deck Institute (SDI), "Design Manual for Composite Decks, Form Decks and Roof Decks."
- B. Qualification of Field Welding: Use qualified welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS.
 - 1. Welded decking in place is subject to inspection and testing. Owner will bear expense of removing and replacing portions of decking for testing purposes if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.
- C. Underwriters' Label: Provide metal deck units listed in Underwriters' Laboratories "Fire Resistance Directory", with each deck unit bearing the UL label and marking for specific system detailed.
- D. FM Listing: Provide steel roof deck units that have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for "Class I" fire-rated construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel for Painted Metal Deck Units: ASTM A 611, grade as required to comply with SDI specifications.
- B. Steel for Galvanized Metal Deck Units: ASTM A 653, grade as required to comply with SDI specifications.
- C. Miscellaneous Steel Shapes: ASTM A 36.
- D. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.
- E. Galvanizing: ASTM A 525, G90.
- F. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.
- G. Paint: Manufacturer's baked-on, rust-inhibitive paint, for application to metal surfaces that have been chemically cleaned and phosphate chemical treated.
- H. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.
- I. Acoustic Sound Barrier Closures: Manufacturer's standard mineral fiber closures.

2.2 FABRICATION

- A. General: Form deck units in lengths to span three or more supports, with flush, telescoped, or nested 2-inch laps at ends and interlocking or nested side laps, of metal thickness, depth, and width as indicated.
- B. Roof Deck Units: Provide deck configurations that comply with SDI "Specifications and Commentary for Steel Roof Deck." Unless noted otherwise, deck shall be 1 1/2" x 22 gauge galvanized (G60) SD, Type B wide rib decking.
- C. Metal Cover Plates: Fabricate metal cover plates for end-abutting deck units of not less than same thickness as decking. Form to match contour of deck units and approximately 6 inches wide.
- D. Metal Closure Strips: Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 0.045-inch min. (18 gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.
- E. Roof Sump Pans: Fabricate from single piece of 0.071-inch min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3 inches wide.

Recess pans not less than 1-1/2 inches below roof deck surface unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field by others.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install deck units and accessories in accordance with manufacturer's recommendations, shop drawings, and as specified herein.
- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.
- C. Align deck units for entire length of run of cells and with close alignment between cells at ends of abutting units.
- D. Place deck units flat and square, secured to adjacent framing without warp or deflection.
- E. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
- F. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- G. Do not use deck units for storage or working platforms until permanently secured.
- H. Fastening Deck Units:
 - 1. Tack weld or use self-tapping No. 8 or larger machine screws at 4 feet o.c. for fastening end closures.
 - 2. Fasten roof deck units to steel supporting members as indicated on drawings. In addition, secure deck to each supporting member in ribs where side laps occur.
 - 3. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
 - a. Use welding washers where recommended by deck manufacturer.
 - 4. Mechanical fasteners, either powder-actuated or pneumatically driven, may be used in lieu of welding. Locate mechanical fasteners and install in accordance with deck manufacturer's instructions.
 - 5. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading as indicated on drawings.
 - a. Keep the interiors of cells that will be used as raceways free of welds having sharp points or edges.
- I. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.
- J. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.
- K. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of deck units, except where taped joints are required.

- L. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12 inches o.c. with at least one weld at each corner.
- M. Closure Strips:
 - 1. Provide metal closure strips at open uncovered ends and edges of roof decking and in voids between decking and other construction. Weld into position to provide a complete decking installation.
 - 2. Provide flexible closure strips instead of metal closures, at Contractor's option, wherever their use will ensure complete closure. Install with adhesive in accordance with manufacturer's instructions.
- N. Touch-Up Painting: After decking installation, wire brush, clean, and paint scarred areas, welds, and rust spots on top and bottom surfaces of decking units and supporting steel members.
 - 1. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
 - 2. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.
- O. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.
- P. Touch-Up Painting: Cleaning and touch-up painting of field welds, abraded areas, and rust spots, as required after erection and before proceeding with field painting, is included in Division 9 under "Painting."

END OF SECTION 05 31 00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior non-load-bearing wall framing.
 - 2. Soffit framing.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for masonry shelf angles and connections.
 - 2. Section 09 22 16 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Delegated-Design Submittal: For cold-formed steel framing.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

D. Research Reports: For non-standard cold-formed steel framing, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- D. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. [AllSteel & Gypsum Products, Inc.](#)
 2. [CEMCO; California Expanded Metal Products Co.](#)
 3. [ClarkDietrich Building Systems.](#)
 4. [Consolidated Fabricators Corp.; Building Products Division.](#)
 5. [Craco Manufacturing, Inc.](#)
 6. [Custom Stud Inc.](#)
 7. [Formetal Co. Inc. \(The\).](#)

8. [Marino\WARE.](#)
9. [SCAFCO Corporation.](#)
10. [Southeastern Stud & Components, Inc.](#)
11. [Steel Construction Systems.](#)
12. [Steeler, Inc.](#)
13. [Super Stud Building Products Inc.](#)
14. [United Metal Products, Inc.](#)

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 1. Design Loads: As indicated on structural drawings.
 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height.
 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1-1/2 inches (38 mm).
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Design Standards:
 1. Floor and Roof Systems: AISI S210.
 2. Wall Studs: AISI S211.
 3. Headers: AISI S212.
 4. Lateral Design: AISI S213.
- D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 1. Grade: As required by structural performance.

2. Coating: G60 Minimum.
- B. Steel Sheet for Vertical Deflection Drift Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
1. Grade: As required by structural performance.
 2. Coating: G60 Minimum.

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: As required by structural performance.
 3. Section Properties: As required by structural performance.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: As required by structural performance.
- C. Vertical Deflection Clips: Manufacturer's standard bypass head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [ClarkDietrich Building Systems](#).
 - b. [Marino\WARE](#).
 - c. [SCAFCO Corporation](#).
 - d. [Steel Network, Inc. \(The\)](#).
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: As required by structural performance.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: As required by structural performance.
 - b. Flange Width: **1 inch (25 mm)** plus the design gap for one-story structures.

2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: As required by structural performance.
 - b. Flange Width: equal to sum of outer deflection track flange width plus 1 inch (25 mm).

- F. Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure, as follows:
 1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: 1 inch plus the design gap.

- G. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 SOFFIT FRAMING

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
 1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: As required by structural performance.
 3. Section Properties: As required by structural performance.

2.6 FURRING

- A. Furring: Manufacturer's standard Z-shaped steel sections, of depths indicated, unpunched, with stiffened flanges, and as follows:
 1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: As required by structural performance.

2.7 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.
 4. Anchor clips.
 5. End clips.
 6. Foundation clips.
 7. Gusset plates.
 8. Stud kickers and knee braces.

9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or ASTM A 780.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.10 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of **1/8 inch in 10 feet (1:960)** and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus **1/8 inch (3 mm)** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of **1/8 inch (3 mm)**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing 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. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than **1/4 inch (6 mm)** to ensure a uniform bearing surface on supporting concrete or masonry construction.
- B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding **1/16 inch (1.6 mm)**.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of **1/8 inch in 10 feet (1:960)** and as follows:
 - 1. Space individual framing members no more than plus or minus **1/8 inch (3 mm)** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16 inches (406 mm) As indicated.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Connect drift clips to cold-formed metal framing and anchor to building structure.
- E. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Material Completion.

END OF SECTION 05 40 00

SECTION 05 50 00 - METAL FABRICATIONS

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. Steel framing and supports for mechanical and electrical equipment.
 - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 3. Metal ladders.
 - 4. Metal bollards.
 - 5. Metal downspout boots.
 - 6. Loose bearing and leveling plates for applications where they are not specified in other Sections.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
 - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Fasteners.
 - 2. Shrinkage-resisting grout.
 - 3. Manufactured metal ladders.
 - 4. Metal bollards.
 - 5. Metal downspout boots.

- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 1. Steel framing and supports for mechanical and electrical equipment.
 - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 3. Metal ladders.
 - 4. Metal bollards.
 - 5. Loose steel lintels.
- C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Welding certificates.
- C. Research Reports: For post-installed anchors.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
 - 2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 (Z275) coating; 0.079-inch (2-mm) nominal thickness.
- D. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- D. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- E. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).
- F. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting." For exterior items, and Section 099123 "Interior Painting." For interior items.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 1. Fabricate units from slotted channel framing where indicated.
 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.

2.7 METAL LADDERS

- A. General:
 1. Comply with ANSI A14.3.
- B. Steel Ladders:
 1. Space siderails 18 inches (457 mm) apart unless otherwise indicated.
 2. Siderails: Continuous, 1/2-by-2-1/2-inch (12.7-by-64-mm) steel flat bars, with eased edges.
 3. Rungs: 3/4-inch- (19-mm-) diameter concrete reinforcing bars, steel bars.
 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 5. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets.
 6. Galvanize and prime exterior ladders, including brackets.
 7. Prime exterior ladders, including brackets and fasteners, with primer specified in Section 099113 "Exterior Painting."
 8. Prime interior ladders, including brackets and fasteners, with primer specified in 099123 "Interior Painting"

2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

- C. Galvanize and prime exterior miscellaneous steel trim.
 - 1. Prime miscellaneous steel trim, including brackets and fasteners, with primer specified in Section 099113 "Exterior Painting."
 - 2. Prime miscellaneous steel trim, including brackets and fasteners, with primer specified in 099123 "Interior Painting"

2.9 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 80 steel pipe.
 - 1. Cap bollards with 1/4-inch- (6.4-mm-) thick, steel plate with domed top.
- B. Fabricate sleeves for bollard anchorage from steel or stainless steel pipe or tubing with 1/4-inch- (6.4-mm-) thick, steel or stainless steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard.
- C. Prime steel bollards with primer specified in Section 099113 "Exterior Painting."

2.10 METAL DOWNSPOUT BOOTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. J.R. Hoe & Sons Inc.
 - 2. Neenah Foundry Company.
 - 3. Piedmont Manufacturing.
- B. Source Limitations: Obtain downspout boots from single source from single manufacturer.
- C. Provide downspout boots made from cast iron or stainless steel, to heights indicated with inlets of size and shape to suit downspouts. Provide units with flanges and holes for countersunk anchor bolts or bolt concealed inside cleanout location.
 - 1. Outlet: Horizontal, to discharge into pipe.
- D. Prime cast-iron downspout boots with primer specified in Section 099113 "Exterior Painting."

2.11 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates.

2.12 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for

each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Galvanize and prime loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with primer specified in Section 099113 "Exterior Painting."

2.13 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.14 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.15 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with primers specified in Section 099113 "Exterior Painting" unless indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Primers Specified in Section 099113 "Exterior Painting": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 - 4. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.16 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.
- B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
- B. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. Fill annular space around bollard solidly with shrinkage-resistant grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately **1/8 inch (3 mm)** toward bollard.
- C. Anchor bollards in place with concrete footings. Center and align bollards in holes **3 inches (75 mm)** above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- D. Fill bollards solidly with concrete, mounding top surface to shed water.

3.3 INSTALLATION OF BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 REPAIRS

- A. Touchup Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum **2.0-mil (0.05-mm)** dry film thickness.
 - 2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting." For exterior items and Section 099123 "Interior Painting." for interior items.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 50 00

SECTION 05 51 36.13 METAL CATWALKS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal Catwalks.

B. Related Sections:

1. Section 05 50 00 "Metal Fabrications" for metal vertical ladders.

1.2 COORDINATION

- A. Coordinate dimensions with existing conditions.

1.3 ACTION SUBMITTALS

A. Product Data:

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

B. Shop Drawings: For roof accessories.

1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

- C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

- D. Delegated-Design Submittal: For metal catwalks indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Metal Catwalk shall withstand thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design catwalk to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Performance: Catwalk shall be designed for 40 pounds per square foot live load.

2.2 METAL CATWALK

- A. Metal Catwalk: Metal planking formed from multiple C-shaped channels with upper surface punched in serrated diamond or rectangular shapes to produce raised slip-resistant surface and drainage holes. Provide support framing, brackets, connectors, nosings, and other accessories and components needed for complete installation.
 - 1. Equip catwalks with safety railings Top rail to be 42" above walking surface. Railing to prevent the passage of a 21" sphere.
 - 2. **Manufacturers:** Basis-of-Design: Subject to compliance with requirements, provide metal catwalks by Unistrut Midwest, other available manufacturers offering acceptable equivalent products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Unistrut; Atkore International.
 - b. Flexible Lifeline Systems
 - c. Unistrut Midwest, 800-586-4787
 - 3. Plank Width: Manufacturer's standard to achieve indicated dimensions. .
 - 4. Walkway Width: As indicated.
 - 5. Channel Depth: As required to meet performance requirements.
 - 6. Plank Material: Zinc-coated (galvanized) steel sheet Galvanized steel sheet, thickness as required to meet performance requirements, perforated, with serrated slip-resistant walking surface.
- B. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: As required by performance requirements.
 - 2. Material: Galvanized steel, ASTM A653/A653M, structural steel, **Grade 33**, with **G90** coating; thickness as required by performance requirements.
- C. Anchors and attachments, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
 - 1. Manufacturer's standard clamps and related accessories.
 - 2. Finish: Manufacturer's standard.

2.3 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, **G90 (Z275)** coating designation.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. FASTENERS
 - 1. General: Unless otherwise indicated, provide zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5. Select fasteners for type, grade, and class required.
 - 2. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A307, Grade A**; with hex nuts, **ASTM A563**; and, where indicated, flat washers

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify dimensions of attic area at metal catwalk location.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install metal catwalk according to manufacturer's written instructions.
 - 1. Install metal catwalk level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor metal catwalk securely in place so it is capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of metal catwalk and fit them to substrates.
 - 4. Verify that locations of access points are served by locations of metal catwalk.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
- B. Clean exposed surfaces according to manufacturer's written instructions.
- C. Replace components that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 05 51 36.13

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel pipe and tube railings.
- B. Related Requirements:
 - 1. Section 05 51 12 "Metal Pan Stairs" for steel tube railings associated with metal pan stairs.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. 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.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 2. Fittings and brackets.
- D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Evaluation Reports: For post-installed anchors, from ICC-ES.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.4 FASTENERS

- A. General: Provide the following:
 - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Section 09 96 00 "High-Performance Coatings."
- C. Intermediate Coats and Topcoats: Provide products that comply with Section 09 96 00 "High-Performance Coatings."
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

- E. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Form Changes in Direction as Follows:
 - 1. By bending or by inserting prefabricated elbow fittings.
- J. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- O. For railing posts set in concrete, provide sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

2.7 STEEL AND IRON FINISHES

- A. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, galvanize anchors to be embedded in exterior concrete or masonry.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below:
 - 1. Railings Indicated to Receive Primers Specified in Section 09 96 00 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
- D. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.
 - 1. Color: As selected by Design Professional from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.4 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Cover anchorage joint with flange of same metal as post, attached to post with set screws.

3.5 ATTACHING RAILINGS

- A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends.
- B. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.

3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 96 00 "High-Performance Coatings."

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Material Completion.

END OF SECTION 05 52 13

SECTION 05 73 00 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel and iron decorative railings.

1.2 DEFINITIONS

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

1.3 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible.
- B. Coordinate installation of anchorages for railings. 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 items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not meet structural performance requirements.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of railings assembled from standard components.
 - 2. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, and attachment details.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design.
- D. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 2. Fittings and brackets.
 3. Welded connections.
- E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Welding certificates.
- C. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.7 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 1. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches (600 mm) in length.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Steel and Iron Decorative Railings:
 1. Basis-of-Design: Subject to compliance with requirements, provide products by Julius Blum & Co., other available manufacturers offering acceptable equivalent products that may be incorporated into the Work include, but are not limited to, the following:

- a. [Architectural Iron Designs, Inc.](#)
 - b. [R & B Wagner, Inc.](#)
2. Steel or cast iron rings:
- a. King Architectural metals 45-844
 - b. Custom Ornamental Ironworks 40-905
 - c. Everett Steel RG 491-8
- B. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of railings and are based on the specific system indicated. See Section 01 60 00 "Product Requirements."
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
1. Steel: 72 percent of minimum yield strength.
- C. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
 - a. Uniform load of **50 lbf/ft. (0.73 kN/m)** applied in any direction.
 - b. Concentrated load of **200 lbf (0.89 kN)** applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of **50 lbf (0.22 kN)** applied horizontally on an area of **1 sq. ft. (0.093 sq. m)**.
 - b. Infill load and other loads need not be assumed to act concurrently.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: **120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**, material surfaces.

2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
 - 1. Provide formed-steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.

2.4 STEEL AND IRON

- A. Tubing: ASTM A 500/A 500M (cold formed) or ASTM A 513.
- B. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.5 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless exposed fasteners are unavoidable.
 - 1. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

2.6 MISCELLANEOUS MATERIALS

- A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds; no evidence of a welded joint.
- I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- J. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- K. Form changes in direction as follows:
 1. By bending to smallest radius that will not result in distortion of railing member.
- L. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

- M. Close exposed ends of hollow railing members with prefabricated end fittings.
- N. Brackets, Flanges, Fittings, and Anchors: Provide brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
- O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- P. For railing posts set in concrete, provide steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
- B. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.9 STEEL AND IRON FINISHES

- A. Powder-Coat Finish: Prepare, treat, and coat nongalvanized ferrous metal to comply with resin manufacturer's written instructions and as follows:
 - 1. Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Treat prepared metal with iron-phosphate pretreatment, rinse, and seal surfaces.
 - 3. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
 - 4. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Set posts plumb within a tolerance of **1/16 inch in 3 feet (2 mm in 1 m)**.
 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet (5 mm in 3 m)**.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.4 ANCHORING POSTS

- A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

3.5 ATTACHING RAILINGS

- A. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends or connected to railing ends using nonwelded connections.

3.6 INSTALLING HANDRAIL CAPS

- A. Apply handrail caps to top rails where indicated, complying with manufacturer's written instructions for cutting, mounting, forming, welding, cleaning, applying end caps, and finishing.
- B. Minimize number of joints in caps by installing in lengths as long as possible. Retain one of two subparagraphs below. First method will produce black line at joints in all but black-colored material.

3.7 CLEANING

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 13 "Exterior Painting".

3.8 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 73 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Rooftop equipment bases and support curbs.
 - 2. Wood blocking and nailers.
 - 3. Wood sleepers.
 - 4. Plywood backing panels.
- B. Related Requirements:
 - 1. Section 06 16 00 "Sheathing" for sheathing, subflooring, and underlayment.

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater size but less than 5 inches nominal (114 mm actual) size in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NHLA: National Hardwood Lumber Association.
 - 3. NLGA: National Lumber Grades Authority.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include

physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Metal framing anchors.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 3. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal (38-mm actual) thickness or less; no limit for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
 - 1. Concealed blocking.
 - 2. Roof framing and blocking with in the building envelope.
 - 3. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
- C. Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:
 - 1. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 - 2. Eastern softwoods, No. 2 Common grade; NELMA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than **3/4-inch (19-mm)** nominal thickness.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E.

- F. Lag Bolts: ASME B18.2.1.
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A ; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and

PART 3 - ASTM F 594, Alloy Group 1 or 2.EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
- F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated.
- G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.

- I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- J. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
 - 3. NES NER-272 for power-driven fasteners.
- K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 53

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Parapet sheathing.
3. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Section 06 10 53 "Miscellaneous Rough Carpentry" for plywood backing panels.
2. Section 07 25 00 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.3 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

- B. [<Double click to insert sustainable design text for manufacturer qualifications.>](#)

- C. [<Double click to insert sustainable design text for vendor qualifications.>](#)

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS

- A. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- B. Factory mark panels to indicate compliance with applicable standard.

2.2 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b for exterior construction not in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.3 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [CertainTeed Corporation; Saint-Gobain North America.](#)
 - b. [Continental Building Products, LLC.](#)
 - c. [National Gypsum Company.](#)
 - d. [USG Corporation.](#)
 - 2. Type and Thickness: Regular, **1/2 inch (13 mm)** thick.
 - 3. Size: **48 by 96 inches (1219 by 2438 mm)** for vertical installation.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. For roof and parapet sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- B. Nails, Brads, and Staples: ASTM F 1667.

- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.
- E. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
 - 1. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C 1002.
 - 2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
- D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.

- 1.
 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
 3. Install panels with a **3/8-inch (9.5-mm)** gap where non-load-bearing construction abuts structural elements.
 4. Install panels with a **1/4-inch (6.4-mm)** gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
1. Space fasteners approximately **8 inches (200 mm)** o.c. and set back a minimum of **3/8 inch (9.5 mm)** from edges and ends of panels.
- D. Seal sheathing joints according to sheathing manufacturer's written instructions.
1. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 06 16 00

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

1. This Section includes the following:
 - a. Plastic-laminate cabinets with PCV edge-banding.
 - b. Solid-surfacing-material countertops, thresholds and window stools.

1.2 DEFINITIONS

1. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.3 SUBMITTALS

1. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - a. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - b. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.
2. Samples for Verification:
 - c. Lumber and panel products with shop-applied opaque finish, 50 sq. in. for lumber and 8 by 10 inches for panels, for each finish system and color, with exposed surface finished.
 - d. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
 - e. Thermoset decorative-panels, 8 by 10 inches, for each type, color, pattern, and surface finish, with edge banding on 1 edge.
 - f. Solid-surfacing materials, 4 inches square.
 - g. Exposed cabinet hardware and accessories, one unit for each type and finish as requested by the Design Professional.
3. Product Certificates: For each type of product, signed by product manufacturer.
4. Woodwork Quality Standard: AWI Member.

1.4 QUALITY ASSURANCE

1. Fabricator Qualifications: AWI-member, with minimum of 5 years continuous experience in performing work of similar quality and scope.
2. Installer Qualifications: Fabricator of products.
3. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements. The requirements for meeting AWI's "Architectural Woodwork Quality Standards" is a minimum, and we have indicated the variance from these with our drawings.
4. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

1. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.6 PROJECT CONDITIONS

1. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
2. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - a. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.7 COORDINATION

1. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

1. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
2. Wood Species for Opaque Finish: Any closed-grain hardwood.
3. Wood Products: Comply with the following:
 - a. Hardboard: AHA A135.4.
 - b. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
 - c. Particleboard: ANSI A208.1, Grade M-2.
 - d. Softwood Plywood: DOC PS 1.
4. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated including metal laminates or, if not indicated, as required by woodwork quality standard.
 - a. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates as selected by the Design Professional from the following manufacturers:
 - b. Arborite.
 - c. Formica Corporation.
 - d. Lab Design. Basis of Design for existing building. Labdesignlaminates.com; (800) 524-2757.
 - e. Nevamar.
 - f. Wilsonart International; Div. of Premark International, Inc.
 - e. PVC Edge Banding: Additional manufacturers may be approved by the Design Professional.
 - a. Adwood.
 - b. Trim Lok Inc.
 - c. Zoro.
6. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avonite, Inc.
 - b. E. I. du Pont de Nemours and Company, Corian. Basis of Design.
 - c. Formica Corporation.
 - d. Wilsonart International; Div. of Premark International, Inc.
 - b. Type: Standard type or Veneer type made from material complying with requirements for Standard type, as indicated.

- a. Colors and Patterns: Match Architect's sample as selected from grades 1 – 5.

2.2 CABINET HARDWARE AND ACCESSORIES

1. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
2. Back-mounted Pulls: BHMA A156.9, B01521.
3. Wire Pulls: Backmounted, solid metal, 4-inches long, 5/16 in in diameter.
4. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
5. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type.
6. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:
 - a. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.
7. Drawer Slides: BHMA A156.9, B05091.
 - a. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
 - b. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.
8. Grommets: Molded-plastic grommets and matching plastic caps with slot for wire passage. Provide Basis-of-Design products indicated or comparable products approved by Architect by Grainger, or the grommet.com.
 - a. Basis-of-Design: Doug Mockett and Company.
 - i. Provide "TG" (typical).
 - ii. Provide "XG" for large plugs (coordinate locations with Design Professional prior to installation).
9. Security Screen Components: Basis of Design:
<https://www.crlaurence.com/crlapps/showLine/default.aspx?GroupID=9176>
 - a. Round Partition End Post: PP49 Slimline Series, clear glazing in size(s) as shown on the drawings.
10. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A1512.6.9.
11. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with HMA A156.18 for BHMA finish numbers indicated.
 - a. Either of the following is acceptable, provided that a single selection is used throughout, from a single manufacturer. Provide sample for verification.
 - a. BHMA 626: Satin chromium plated over nickel, base metal: Brass, bronze.
 - b. BHMA 652: Satin chromium plated over nickel, base metal: Steel.
 - b. Plastic laminate woodwork: BHMA 630: Satin finish stainless steel.
 - c. Door Locks: BHMA A156.11, E07121.
 - d. Drawer Locks: BHMA A156.11, E7041.

2.3 MISCELLANEOUS MATERIALS

1. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
2. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
3. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

4. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Contact Adhesive: 250 g/L.

2.4 FABRICATION, GENERAL

1. Interior Woodwork Grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard. No edgeband tape – plastic laminate to match face of drawers and doors.
2. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
3. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - a. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
 - b. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
4. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
5. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.5 SOLID-SURFACING-MATERIAL COUNTERTOPS, THRESHOLDS AND WINDOW STOOLS

1. Grade: Custom.
2. Solid-Surfacing-Material Thickness: 1/2 inch.
3. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
 - a. Fabricate tops with loose backsplashes for field application.
4. Drill holes in countertops for plumbing fittings in shop.

2.6 SHOP FINISHING

1. Grade: Provide finishes of same grades as items to be finished.
2. General: Finish architectural woodwork at fabrication shop as specified in this Section. Defer on-site final touchup, cleaning, and polishing until after installation.
3. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

PART 3 - EXECUTION

3.1 PREPARATION

1. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
2. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

1. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
2. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
3. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
4. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
5. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
6. Cabinets: Complete installation of hardware and accessory items as indicated.
 - a. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
7. Countertops, Thresholds and Window Stools: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - a. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - b. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - c. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."
8. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.3 ADJUSTING AND CLEANING

1. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
2. Clean, lubricate, and adjust hardware.
3. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 40 23

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

1. This Section includes the following:
 - a. Plastic-laminate cabinets with PCV edge-banding.
 - b. Solid-surfacing-material countertops, thresholds and window stools.

1.2 DEFINITIONS

1. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.3 SUBMITTALS

1. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - a. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - b. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.
2. Samples for Verification:
 - c. Lumber and panel products with shop-applied opaque finish, 50 sq. in. for lumber and 8 by 10 inches for panels, for each finish system and color, with exposed surface finished.
 - d. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
 - e. Thermoset decorative-panels, 8 by 10 inches, for each type, color, pattern, and surface finish, with edge banding on 1 edge.
 - f. Solid-surfacing materials, 4 inches square.
 - g. Exposed cabinet hardware and accessories, one unit for each type and finish as requested by the Design Professional.
3. Product Certificates: For each type of product, signed by product manufacturer.
4. Woodwork Quality Standard: AWI Member.

1.4 QUALITY ASSURANCE

1. Fabricator Qualifications: AWI-member, with minimum of 5 years continuous experience in performing work of similar quality and scope.
2. Installer Qualifications: Fabricator of products.
3. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements. The requirements for meeting AWI's "Architectural Woodwork Quality Standards" is a minimum, and we have indicated the variance from these with our drawings.
4. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

1. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.6 PROJECT CONDITIONS

1. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
2. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - a. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.7 COORDINATION

1. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

1. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
2. Wood Species for Opaque Finish: Any closed-grain hardwood.
3. Wood Products: Comply with the following:
 - a. Hardboard: AHA A135.4.
 - b. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
 - c. Particleboard: ANSI A208.1, Grade M-2.
 - d. Softwood Plywood: DOC PS 1.
4. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated including metal laminates or, if not indicated, as required by woodwork quality standard.
 - a. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates as selected by the Design Professional from the following manufacturers:
 - b. Arborite.
 - c. Formica Corporation.
 - d. Lab Design. Basis of Design for existing building. Labdesignlaminat.com; (800)524-2757.
 - e. Nevamar.
 - f. Wilsonart International; Div. of Premark International, Inc.
 - e. PVC Edge Banding: Additional manufacturers may be approved by the Design Professional.
 - a. Adwood.
 - b. Trim Lok Inc.
 - c. Zoro.
6. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avonite, Inc.
 - b. E. I. du Pont de Nemours and Company, Corian. Basis of Design.
 - c. Formica Corporation.
 - d. Wilsonart International; Div. of Premark International, Inc.
 - b. Type: Standard type or Veneer type made from material complying with requirements for Standard type, as indicated.

- a. Colors and Patterns: Match Architect's sample as selected from grades 1 – 5.

2.2 CABINET HARDWARE AND ACCESSORIES

1. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
2. Back-mounted Pulls: BHMA A156.9, B01521.
3. Wire Pulls: Backmounted, solid metal, 4-inches long, 5/16 in in diameter.
4. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
5. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type.
6. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:
 - a. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.
7. Drawer Slides: BHMA A156.9, B05091.
 - a. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
 - b. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.
8. Grommets: Molded-plastic grommets and matching plastic caps with slot for wire passage. Provide Basis-of-Design products indicated or comparable products approved by Architect by Grainger, or the grommet.com.
 - a. Basis-of-Design: Doug Mockett and Company.
 - i. Provide "TG" (typical).
 - ii. Provide "XG" for large plugs (coordinate locations with Design Professional prior to installation).
9. Security Screen Components: Basis of Design:
<https://www.crlaurence.com/crlapps/showLine/default.aspx?GroupID=9176>
 - a. Round Partition End Post: PP49 Slimline Series, clear glazing in size(s) as shown on the drawings.
10. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A1512.6.9.
11. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with HMA A156.18 for BHMA finish numbers indicated.
 - a. Either of the following is acceptable, provided that a single selection is used throughout, from a single manufacturer. Provide sample for verification.
 - a. BHMA 626: Satin chromium plated over nickel, base metal: Brass, bronze.
 - b. BHMA 652: Satin chromium plated over nickel, base metal: Steel.
 - b. Plastic laminate woodwork: BHMA 630: Satin finish stainless steel.
 - c. Door Locks: BHMA A156.11, E07121.
 - d. Drawer Locks: BHMA A156.11, E7041.

2.3 MISCELLANEOUS MATERIALS

1. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
2. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
3. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

4. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Contact Adhesive: 250 g/L.

2.4 FABRICATION, GENERAL

1. Interior Woodwork Grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard. No edgeband tape – plastic laminate to match face of drawers and doors.
2. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
3. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - a. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
 - b. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
4. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
5. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.5 SOLID-SURFACING-MATERIAL COUNTERTOPS, THRESHOLDS AND WINDOW STOOLS

1. Grade: Custom.
2. Solid-Surfacing-Material Thickness: 1/2 inch.
3. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
 - a. Fabricate tops with loose backsplashes for field application.
4. Drill holes in countertops for plumbing fittings in shop.

2.6 SHOP FINISHING

1. Grade: Provide finishes of same grades as items to be finished.
2. General: Finish architectural woodwork at fabrication shop as specified in this Section. Defer on-site final touchup, cleaning, and polishing until after installation.
3. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

PART 3 - EXECUTION

3.1 PREPARATION

1. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
2. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

1. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
2. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
3. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
4. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
5. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
6. Cabinets: Complete installation of hardware and accessory items as indicated.
 - a. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
7. Countertops, Thresholds and Window Stools: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - a. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - b. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - c. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."
8. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.3 ADJUSTING AND CLEANING

1. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
2. Clean, lubricate, and adjust hardware.
3. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 40 23

SECTION 06 46 00 - WOOD TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Match interior standing and running trim in the Auditorium and the Lobby, existing building.
2. Wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
3. Shop priming of wood trim.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

C. Samples for Verification:

1. Lumber and panel products with shop-applied opaque finish, **5 inches (125 mm)** wide by **12 inches (300 mm)** long for lumber, for each finish system and color, with one-half of exposed surface finished.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a member of AWI.

B. Installer Qualifications: Fabricator of products.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver wood trim until operations that could damage wood trim have been completed in installation areas. If wood trim must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Environmental Limitations for Interior Work: Do not deliver or install interior wood trim until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that wood trim can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 WOOD TRIM, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of wood trim indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

- A. Grade: Premium.
- B. Wood Species: Any closed-grain hardwood.
- C. Profile: Match existing in the Auditorium and the Lobby of the existing building.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood trim and quality grade specified unless otherwise indicated.
 - 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches (75 mm) wide.
 - 2. Wood Moisture Content for Interior Materials: 5 to 10 percent.

2.4 MISCELLANEOUS MATERIALS

- A. Interior Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

2.5 FABRICATION

- A. Ease edges to radius indicated for the following:
 - 1. Edges of Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
 - 2. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members except for members with ends exposed in finished work.
- C. Assemble casings in shop except where shipping limitations require field assembly.
- D. Assemble moldings in shop to maximum extent possible. Miter corners in shop and prepare for field assembly with bolted fittings designed to pull connections together.

2.6 SHOP PRIMING

- A. Interior Wood Trim for Opaque Finish: Shop prime with one coat of wood primer specified in Section 09 91 23 "Interior Painting."
- B. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing wood trim, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of wood trim. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition wood trim to average prevailing humidity conditions in installation areas.
- B. Before installing architectural wood trim, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install wood trim to comply with same grade as item to be installed.

- B. Assemble wood trim and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install wood trim level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**.
- D. Scribe and cut wood trim to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor wood trim to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1. For shop-finished items, use filler matching finish of items being installed.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than **36 inches (900 mm)** long except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Fill gaps, if any, between top of base and wall with plastic wood filler; sand smooth; and finish same as wood base if finished.
 - 2. Install standing and running trim with no more variation from a straight line than **1/8 inch in 96 inches (3 mm in 2400 mm)**.
- G. Touch up finishing work specified in this Section after installation of wood trim. Fill nail holes with matching filler where exposed.
 - 1. Apply knot-sealer to exposed knots in shop.
 - 2. Apply specified finish coats to exposed surfaces where only sealer/prime coats are applied in shop.
- H. Refer to Section 09 91 23 "Interior Painting" for final finishing of installed wood trim.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective wood trim, where possible, to eliminate functional and visual defects; where not possible to repair, replace wood trim. Adjust joinery for uniform appearance.
- B. Clean wood trim on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 46 00

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Cold-applied, emulsified-asphalt dampproofing.
- B. Related Requirements:

1.3 Section 04 20 00 "Unit Masonry" ACTION SUBMITTALS

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

1.4 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide auxiliary materials recommended in writing by manufacturer of primary materials.
- B. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ChemMasters, Inc.
 - 2. Gardner-Gibson, Inc.

3. [Henry Company.](#)
4. [Karnak Corporation.](#)
5. Koppers Inc.
6. Malarkey Roofing Company.
7. [W. R. Meadows, Inc.](#)

- B. Trowel Coats: ASTM D 1227, Type II, Class 1.
- C. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
- D. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to the dampproofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.
- C. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

- B. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least **1/4 inch (6 mm)** onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
 - 1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.
 - 2. Lap dampproofing at least **1/4 inch (6 mm)** onto shelf angles supporting veneer.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than **1 gal./100 sq. ft. (0.4 L/sq. m)**.

3.5 CLEANING

- A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 11 13

SECTION 07 13 26 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Modified bituminous sheet waterproofing.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
 - 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
 - 1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.
- C. Samples: For each exposed product and for each color and texture specified, including the following products:
 - 1. **8-by-8-inch (200-by-200-mm)** square of waterproofing and flashing sheet.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.
- C. Sample Warranties: Copy of special waterproofing manufacturer's and Installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation.
 - 1. Build for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatments, inside and outside corner treatments, and protection.
 - a. Size: As indicated on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Design Professional 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 Material Completion.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
 - 1. Warranty Period: Three years from date of Material Completion.
- B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.

1. Warranty includes removing and reinstalling protection board, drainage panels, insulation, pedestals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum **60-mil (1.5-mm)** nominal thickness, self-adhering sheet consisting of **56 mils (1.4 mm)** of rubberized asphalt laminated on one side to a **4-mil- (0.10-mm-)** thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
 1. **Basis-of-Design Product:** Subject to compliance with requirements, provide **Grace Construction Products; W.R. Grace & Co. -- Conn.**; Bituthene 4000 or a comparable product by one of the following:
 - a. **Carlisle Coatings & Waterproofing Inc.**
 - b. **W. R. Meadows, Inc.**
 2. Physical Properties:
 - a. Tensile Strength, Membrane: **250 psi (1.7 MPa)** minimum; ASTM D 412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
 - c. Low-Temperature Flexibility: Pass at **minus 20 deg F (minus 29 deg C)**; ASTM D 1970/D 1970M.
 - d. Crack Cycling: Unaffected after 100 cycles of **1/8-inch (3-mm)** movement; ASTM C 836/C 836M.
 - e. Puncture Resistance: **40 lbf (180 N)** minimum; ASTM E 154/E 154M.
 - f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at **70 deg F (21 deg C)**; ASTM D 570.
 - g. Water Vapor Permeance: **0.05 perm (2.9 ng/Pa x s x sq. m)** maximum; ASTM E 96/E 96M, Water Method.
 - h. Hydrostatic-Head Resistance: **200 feet (60 m)** minimum; ASTM D 5385.
 3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
 - B. Primer: Liquid waterborne primer recommended for substrate by sheet-waterproofing material manufacturer.
 - C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
 - D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
 - E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
 - F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm), predrilled at 9-inch (229-mm) centers.
 - G. Protection Course: Molded-polystyrene board insulation, ASTM C 578, Type I, 0.90-lb/cu. ft. (15-kg/cu. m) minimum density, 1-inch (25-mm) minimum thickness.

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 waterproofing.
 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing 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.

- E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- F. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.
- G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
- H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D 6135.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform **2-1/2-inch- (64-mm-)** minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
 - 1. When ambient and substrate temperatures range between **25 and 40 deg F (minus 4 and plus 5 deg C)**, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than **60 deg F (16 deg C)**.
- D. Two-Ply Application: Install sheets to form a membrane with lap widths not less than 50 percent of sheet widths, to provide a minimum of two thicknesses of sheet membrane over areas to receive waterproofing.
 - 1. Use Application at locations without substrate.
- E. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.
- F. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- G. Seal edges of sheet-waterproofing terminations with mastic.
- H. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending **6 inches (150 mm)** beyond repaired areas in all directions.
- J. Immediately install protection course with butted joints over waterproofing membrane.

1. Board insulation may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests.
- B. Waterproofing will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.5 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 13 26

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Mineral-wool blanket.
- B. Related Requirements:
 - 1. Section 04 20 00 "Unit Masonry" for insulation installed in masonry cells.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MINERAL-WOOL BLANKETS

- A. Mineral-Wool Blanket, Unfaced (Interior walls indicated as sound attenuation walls): ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Thermafiber, Inc.
 - b. Owens Corning Company.
 - c. Fibrex Insulations Inc.

- B. Mineral-Wool Blanket, Reinforced-Foil Faced (Exterior walls with metal studs, soffit and fascia): ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less per ASTM E 84); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Fibrex Insulations, Inc.
 - b. Thermafiber, Inc.
 - c. Owens Corning Company.

2.2 ACCESSORIES

- A. Insulation Netting:
 1. Material: Fiberglass
 2. Mesh Size: maximum of 1" x 2"

PART 3 - EXECUTION

3.1 Examination

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.
- E. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
 - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 04 20 00 "Unit Masonry."

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
 - a. Exterior Walls: Set units with facing placed at interior of construction.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.6 INSTALLATION OF REFLECTIVE INSULATION

- A. Install sheet radiant barriers according to ASTM C 1744.
- B. Install interior radiation control coating system according to ASTM C 1321.

3.7 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 41 13 - MANUFACTURED FASCIA AND SOFFIT PANELS

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. Concealed-fastener, lap-seam metal wall panels.
 - 2. Metal soffit panels.
- B. Related Sections:
 - 1. Section 05 40 00 "Cold Formed Metal Framing" for supports for wall and soffit panels.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Design Professional, metal panel Installer, structural-support Installer, and installers whose work interfaces with or affects metal panels.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 5. Review temporary protection requirements for metal panel systems during and after installation.
 - 6. Review procedures for repair of metal panels damaged after installation.
 - 7. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
 - C. Evaluation Reports: For foam-plastic insulation, from ICC-ES.
 - D. Field quality-control reports.
 - E. Sample Warranties: For special warranties.
- 1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For metal panels to include in maintenance manuals.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
 - B. UL-Certified, Portable Roll-Forming Equipment: Portable roll forming equipment is not acceptable.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
 - B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.
- E. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

- A. Coordinate metal wall panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: 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. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Deflection Limits: For wind loads, no greater than 1/240 of the span.
 - 3.

- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL/FASCIA PANELS

- A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners[**and factory-applied sealant**] in side laps. Include accessories required for weathertight installation.

- B. Flush-Profile, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels.
 - 1. Provide products by one of the following:
 - a. MBCI "FW-120"
 - b. Fabral "Décor-Flush"
 - c. Berridge "FW-12"

 - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: 0.022 inch (0.56 mm).
 - b. Exterior Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Design Professional from manufacturer's full range.

2.3 METAL SOFFIT PANELS

- A. General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

- B. Reveal-Joint-Profile Metal Soffit Panels: Solid and Perforated panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with recessed reveal joint between panels.
1. Provide products by one of the following:
 - a. MBCI "Artisxan Series"
 - b. Fabral "Posi-lock"
 - c. Berridge "FW-12"
 2. Material: Same material, finish, and color as metal wall panels.

2.4 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum **1-inch- (25-mm-)** thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners
- D. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements

demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

- B. On-Site Fabrication: Not permitted.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

2.6 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Install screw fasteners in predrilled holes.

3. Locate and space fastenings in uniform vertical and horizontal alignment.
 4. Install flashing and trim as metal panel work proceeds.
 5. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 6. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
 2. .
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- E. .

3.3 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of **1/4 inch in 20 feet (6 mm in 6 m)** on slope and location lines as indicated and within **1/8-inch (3-mm)** offset of adjoining faces and of alignment of matching profiles.

3.4 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- D. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 41 13

SECTION 07 42 43 - COMPOSITE WALL PANELS

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 metal-faced composite wall panels.
- B. Related Sections include the following:
 - 1. Division 5 Section, Cold Formed Metal Framing for Zee furring and miscellaneous metal framing components to be installed under this section.
 - 2. Division 7 Section, Thermal Insulation, for Polyisocyanurate Board Insulation to be installed under this section.
 - 3. Division 7 Section "Joint Sealants" for installation of joint sealants to the extent not specified in this Section.

1.3 DEFINITION

- A. Metal-Faced Composite Wall Panel Assembly: Metal-faced composite wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weathertight wall system.

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Metal-faced composite wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Delegated Design: Design metal-faced composite wall panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft.
- D. Water Penetration Under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- E. Structural Performance: Provide metal-faced composite wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:
 - 1. Wind Loads: As indicated on Structural Drawings.
 - 2. Deflection Limits: Metal-faced composite wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F , ambient; 180 deg F material surfaces.

- G. Design panel system to accommodate substructure tolerance of +0 to -1/8 inch.
- H. Sealed joints shall allow free and silent movement of panels during expansion and contraction while preventing uncontrolled penetration of moisture.
- I. Not Permitted: Vibration harmonics; wind whistles; noises caused by thermal movement; thermal movement transmitted to other building elements; loosening, weakening or fracturing of attachments or components of system.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal-faced composite wall panel and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-, shop-, and field-assembled work.
 - 1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches :
 - a. Flashing and trim.
 - b. Anchorage systems.
- C. Samples for Initial Selection: For each type of metal-faced composite wall panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
 - 2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Metal-Faced Composite Wall Panels: Minimum 12 x 12 inches. Include fasteners, closures, and other metal-faced composite wall panel accessories.
 - a. Composite Panels: Include four-way joint.
 - 2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
 - 3. Accessories: 12-inch- long Samples for each type of accessory.
 - 4. Exposed Gaskets: 12 inches long.
 - 5. Exposed Sealants: For each type and color of joint sealant required. Install joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of metal-faced composite wall panels adjacent to joint sealants.
- E. Delegated-Design Submittal: For metal-faced composite wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer registered in Georgia, responsible for their preparation.
- F. Coordination Drawings: Exterior elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Wall panels and attachments.
 - 2. Stud framing and Furring.
 - 3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
 - 4. Penetrations of wall by pipes and utilities.
- G. Qualification Data: For professional engineer and testing agency.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
- J. Field quality-control reports.
- K. Maintenance Data: For metal wall panels to include in maintenance manuals.
- L. Warranties: Samples of special warranties.
- M. Affidavit certifying that the material meets the requirements specified.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Source Limitations: Obtain each type of metal-faced composite wall panel from single source from single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact joint sealants to joint-sealant manufacturers for testing indicated in subparagraphs below:
 1. Use manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under environmental conditions replicating those that will exist during installation.
 2. Submit no fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 3. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 1. Build mockup of typical wall panel as shown on Drawings; approximately 6' x 6' by full thickness, including supports, attachments, and accessories.
 - a. Include four-way joint for metal-faced composite wall panels.
 2. Conduct water-spray test of mockup of metal-faced composite wall panel assembly, testing for water penetration according to AAMA 501.2.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Approved mockups may become part of the completed Work if undisturbed at time of Material Completion.
- E. Preinstallation Conference: Conduct conference at Project site.
 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal-faced composite wall panel Installer, metal-faced composite wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal-faced composite wall panels including installers of doors, windows, and louvers.
 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 3. Review methods and procedures related to metal-faced composite wall panel installation, including manufacturer's written instructions.

4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal-faced composite wall panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal-faced composite wall panel assembly during and after installation.
8. Review wall panel observation and repair procedures after metal-faced composite wall panel installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal-faced composite wall panels, and other manufactured items so as not to be damaged or deformed. Package metal-faced composite wall panels for protection during transportation and handling.
- B. Unload, store, and erect metal-faced composite wall panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Store metal-faced composite wall panels vertically, covered with suitable weathertight and ventilated covering. Store metal-faced composite wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg F .
- D. Retain strippable protective covering on metal-faced composite wall panel for period of panel installation.

1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal-faced composite wall panels to be performed according to manufacturer's written instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal-faced composite wall panel fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION

- A. Coordinate metal-faced composite wall panel assemblies with rain drainage work, flashing, trim, and construction of studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-faced composite wall panel assemblies that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 2. Warranty Period: Two years from date of Material Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal-faced composite wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Exposed Panel Finish: 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. Finish Warranty Period: 20 years from date of Material Completion.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

- A. General: General: Provide factory-formed metal-faced composite wall panels material fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Alcan Composites USA Inc.; Alucobond.
 - b. Alcoa Inc.; Reynobond PE.
 - c. ALPOLIC, Division of Mitsubishi Chemical America, Inc.; ALPOLIC.
- B. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 1. Surface: Embossed finish.
 2. Exposed Coil-Coated Finishes:
 - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil .
- C. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch- thick, coil-coated aluminum sheet facings.
 1. Panel Thickness: Not less than 6 mm.
 2. Core: Standard.
 3. Exterior Finish: 2-coat fluoropolymer per AAMA 620.
 - a. Color: As selected by Architect from manufacturer's full range.

2.2 FABRICATED METAL-FACED COMPOSITE WALL PANELS

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide Peachtree Protective Covers "Exposed Sealant ES-600" or comparable product by one of the following:
 1. Englert CWP400 Wet Seal System
 2. Westpol Metals Route and Return Wet Seal System
- B. Panel system: Panel system shall be a rout and return exposed sealant system. Refer to the table at the end of the Evaluations for a list of manufacturers' products. Use this table in combination with manufacturers' catalogs or product data to select options or insert characteristics.
- C. Attachment System Components: Formed from extruded aluminum.
Include manufacturer's standard perimeter extrusions with integral weather stripping, panel stiffeners, panel clips and anchor channels.
- D. Panel Sealants:
 1. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal-faced composite wall panels and remain weathertight; and as recommended in writing by panel manufacturer.

2.3 MISCELLANEOUS METAL FRAMING

- A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G60 hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.
- B. Base or Sill Angles or Channels: 0.079-inch nominal thickness.
- C. Hat Shaped Cold-Rolled Furring Channels: Minimum 1/2-inch- wide flange.
 - 1. Nominal Thickness: As required to meet performance requirements.
 - 2. Depth: As indicated
 - 3. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with nominal thickness of 0.040 inch .
 - 4. 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.
- D. Fasteners for Miscellaneous Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten miscellaneous metal framing members to substrates.

2.4 MISCELLANEOUS MATERIALS

- A. Aluminum Extrusions: ASTM B 221 , alloy and temper recommended by manufacturer for type of use and finish indicated.
- B. Fasteners:
 - 1. Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal-faced composite wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.
 - 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

2.5 ACCESSORIES

- A. Wall Panel Accessories: Provide components required for a complete metal-faced composite wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal-faced composite wall panels unless otherwise indicated.
- B. Flashing and Trim: Formed from 0.018-inch- minimum thickness, aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal-faced composite wall panels.

2.6 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970/D 1970M, minimum of 40-mil- thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release backing; cold applied.

2.7 FABRICATION

- A. General: Fabricate and finish metal-faced composite wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate metal-faced composite wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
- C. Metal-Faced Composite Wall Panels: Factory form panels in a continuous process with no glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.
 1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
 2. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
 3. Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant or bond tape.
 4. Dimensional Tolerances:
 - a. Panel Bow: 0.8 percent maximum of panel length or width.
 - b. Squareness: 0.25 inch maximum.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 4. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal-faced composite wall panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal-faced composite wall panel manufacturer for application, but not less than thickness of metal being secured.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal-faced composite wall panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal-faced composite wall panel manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal-faced composite wall panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal-faced composite wall panels to verify actual locations of penetrations relative to seam locations of panels before panel installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal-faced composite wall panel manufacturer's written instructions.

3.3 METAL-FACED COMPOSITE WALL PANEL INSTALLATION

- A. General: Install metal-faced composite wall panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts unless otherwise indicated. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Commence metal-faced composite wall panel installation and install minimum of 300 sq. ft. in presence of factory-authorized representative.
 - 2. Shim or otherwise plumb substrates receiving metal-faced composite wall panels.
 - 3. Flash and seal metal-faced composite wall panels at perimeter of all openings. Do not begin installation until weather barrier and flashings that will be concealed by panels are installed.
 - 4. Install flashing and trim as metal-faced composite wall panel work proceeds.
 - 5. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing.
 - 6. Provide weathertight escutcheons for pipe and conduit penetrating exterior walls.
- B. Fasteners:
 - 1. Aluminum Wall Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior and aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal-faced composite wall panel manufacturer.
- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of metal-faced composite wall panel assemblies. Provide types of

gaskets, fillers, and sealants indicated or, if not indicated, types recommended by panel manufacturer.

1. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
 2. All panel reveals and extents of the panel system shall be caulked. Exterior exposed fasteners are not allowed.
- E. Self-Adhering Sheet Underlayment: At areas of installation over sheathing, install, wrinkle free, on sheathing. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Extend minimum 3" over Bituminous Dampproofing at junctures with masonry construction. Cover underlayment within seven days.
- F. Z-Furring Members:
1. Erect insulation, 1.5" polyisocyanurate rigid specified in Division 7 Section "Thermal Insulation," vertically and hold in place with Z-furring members and adhesive.
 2. At areas of wall exposed to the exterior on both sides, install Z-furring members without insulation.
 3. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 4. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Attachment System Installation, General: Install attachment system required to support metal-faced composite wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
 2. Do not begin installation until weather barrier and flashings that will be concealed by composite panels are installed.
- H. Clip Installation: Attach panel clips to supports at each metal-faced composite wall panel joint at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-returned flanges of wall panels to panel clips with manufacturer's standard fasteners.
1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Division 07 Section "Joint Sealants."

3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal-faced composite wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners

where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal-faced composite wall panel units within installed tolerance of 1/4 inch in 20 feet, nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Water-Spray Test: After completing the installation of 75-foot- by-2-story minimum area of metal-faced composite wall panel assembly, test assembly for water penetration according to AAMA 501.2 in a 2-bay area directed by Architect.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust completed metal-faced composite wall panel installation, including accessories.
- D. Metal-faced composite wall panels will be considered defective if they do not pass tests and inspections.
- E. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.7 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal-faced composite wall panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal-faced composite wall panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.
- B. After metal-faced composite wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal-faced composite wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 43

SECTION 07 54 19 - POLYVINYL-CHLORIDE (PVC) ROOFING

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. Adhered polyvinyl-chloride (PVC) roofing system.

- B. Related Requirements:

- 1. Section 03 52 16 "Lightweight Insulating Concrete" for lightweight insulating concrete deck to be installed where indicated.
 - 2. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
 - 3. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
 - 4. Section 07 72 00 "Roof Accessories" for roof hatches.
 - 5. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

- 1. Meet with Owner, Design Professional, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

B. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Design Professional, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
 1. Base flashings and membrane terminations.
 2. Roof plan showing orientation of roofing, fastening spacings, and patterns for mechanically fastened roofing.
 3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 1. Submit evidence of compliance with performance requirements.

- C. Product Test Reports: For components of roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
- E. Field quality-control reports.
- F. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

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

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty. Installer shall be "Top Tier" installer as determined by Manufacturer. No subcontracting of work under this section will be permitted.
- C. Installer's Foreman or Supervisor must be trained and certified by roofing Manufacturer for the specific type of roofing used on the project and must remain on site during installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

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

1.11 WARRANTY

- A. Warranty shall be provided at no additional cost to the Owner.
- B. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period with No Dollar Limit.
 - 1. Special warranty includes membrane roofing, base flashings, roof insulation, roof edge, roof drain hubs, fasteners, roofing accessories, and other components of roofing system.
 - 2. Warranty shall cover labor and materials to correct leaks and defects encountered during the warranty period and shall take effect on the date of Material completion. Warranty shall not be voided by emergency leak repairs.
 - 3. Warranty Period: 20 years from date of Substantial Completion.
- C. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain components including fasteners, and 07 62 00 Sheet Metal Flashing and Trim for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
 - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures: As indicated on the drawings.
 - 1. Hail-Resistance Rating: MH.
- D. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 PVC ROOFING

- 1. PVC Sheet: ASTM D 4434/D 4434M, Type III, fabric reinforced, fleece or felt backed.
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Duro-Last Roofing, Inc.
 - b. Johns Manville; a Berkshire Hathaway company; KEE.
 - c. Sika Sarnafil;
 - 3. Thickness: 60 mils minimum, thinner membrane will not be accepted.
 - 4. Exposed Face Color: White.
- B. PVC Sheet: ASTM D 6754, fabric reinforced, felt backed.
- 1. Seamans Corporation, FiberTite
 - 2. Thickness: 45 mils..
 - 3. Exposed Face Color: White.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing:
 - 1. Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.
 - 2. Manufacturer's standard PVC coated metal flashing material where indicated.
 - 3. Flashing provided under Section 07 62 00 "Sheet Metal Flashing and Trim" shall be provided by roofing membrane manufacturer or a manufacturer approved by roofing membrane manufacturer and shall be included under warranties for work under this section.
- C. Manufactured Drip Edge:

1. Roofing manufacturer's standard one piece PVC coated drip edge in section lengths not exceeding 12 feet with a horizontal flange and a vertical leg fascia, terminating in a drip edge, and continuous cleat. Provide matching corner units.
 - a. Drip edge shall be tested under ANSI-SPRI ES-1.

- D. Retrofit Roof Drains: Roofing Manufacturer's standard spun aluminum retrofit drain with one piece seamless body, watertight seal, strainer dome and PVC coated flange for direct welding to PVC membrane.
 1. Match size of retrofit drain to size of drainage pipe provided by others.
 2. Provide manufacturer's standard spun aluminum overflow unit at secondary drains.

PART 3 - EXECUTION

3.1 WALKWAYS

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

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 ADHERED ROOFING INSTALLATION

- A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.
 1. Install sheet according to ASTM D 5036.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- H. Install retrofit drains in roof drain plumbing per manufacturer's written recommendations and weld membrane to flange.

3.5 BASE FLASHING INSTALLATION

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

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Design Professional.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion. Owners representative and Design Professional's representative shall be present during inspection.

- C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.7 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Design Professional and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction. Roof shall be free of construction debris, clean, and in a "new" condition upon completion. Roof shall be washed at Contractor's expense if deemed necessary by Owner prior to acceptance.

3.8 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: **<Insert name of Owner>**.
 - 2. Address: **<Insert address>**.
 - 3. Building Name/Type: **<Insert information>**.
 - 4. Address: **<Insert address>**.
 - 5. Area of Work: **<Insert information>**.
 - 6. Acceptance Date: _____.
 - 7. Warranty Period: **<Insert time>**.
 - 8. Expiration Date: _____.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

- a. lightning;
 - b. peak gust wind speed exceeding 60 miles per hour;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
 6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 07 54 19

SECTION 07 71 00 - ROOF SPECIALTIES

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. Roof-edge specialties.
 - 2. Roof-edge drainage systems.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for downspout guards and downspout boots.
 - 2. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
 - 3. Section 07 54 19 "Polyvinyl Chloride (PVC) Roofing" for manufacturer requirements.
 - 4. Section 07 62 00 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim including downspouts.
 - 5. Section 07 72 00 "Roof Accessories" for equipment supports, roof hatches, and other manufactured roof accessory units.
 - 6. Section 07 92 00 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Design Professional, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
 - 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

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 roof specialties.

1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 4. Detail termination points and assemblies, including fixed points.
 5. Include details of special conditions.
- C. Samples: For each type of roof specialty and for each color and texture specified.
- D. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- E. Samples for Verification:
1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
 2. Include copings roof-edge specialties and roof-edge drainage systems made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.
- D. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are SPRI ES-1 tested to specified design pressure.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 07 54 19 "Poly-Vinyl-Chloride (PVC) Roofing.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.
 1. Build mockup of typical roof edge, including fascia, gutter, and downspout, approximately 10 feet long, including supporting construction, seams, attachments, and accessories.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Design Professional 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.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 07 54 19 "Poly-Vinyl-Chloride (PVC) Roofing"
- B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Fluoropolymer Finish: 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. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

- B. SPRI Wind Design Standard: Manufacture and install copings and roof-edge specialties tested according to SPRI ES-1 and capable of resisting the following design pressures:
 - 1. Design Pressure: As indicated on Drawings
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
 - 1. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.040 inch thick
 - a. Surface: finish.
 - b. Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range of standard colors.
 - 2. Corners and ends: Factory mitered and mechanically clinched and sealed watertight.
 - 3. Coping-Cap Attachment Method: Snap-on.
 - a. Face-Leg Cleats: Concealed, continuous [galvanized-steel sheet.

2.3 ROOF-EDGE SPECIALTIES

- A. Canted Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed galvanized-steel sheet cant, 0.028 inch (0.71 mm) thick, minimum, with extended vertical leg terminating in a drip-edge cleat. Provide matching corner units.
 - 1. Extruded-Aluminum Fascia Covers: Extruded aluminum, thickness as required to meet performance requirements.
 - a. Finish: Two-coat fluoropolymer.
 - b. Color: As selected by Architect from manufacturer's full range including premium colors.
 - 2. Corners: Factory mitered and mechanically clinched and sealed watertight.
 - 3. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
- B. Roof Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and continuous cleat. Provide matching corner units.

1. Formed Aluminum Sheet Drip Edge: Aluminum sheet, thickness as required to meet performance requirements.
 - a. Surface: Smooth, flat finish.
 - b. Finish: PVC coated.
 2. Corners: Factory mitered and mechanically clinched and sealed watertight.
 3. Splice Plates: Concealed or Exposed, of same material, finish, and shape as fascia cover.
 4. Receiver: Manufacturer's standard material and thickness.
- C. One-Piece drip edge: Manufactured, one-piece, metal drip edge in section lengths not exceeding 12 feet, with a horizontal flange and vertical leg fascia terminating in a drip edge, and concealed splice plates of same material, finish, and shape as gravel stop. Provide matching corner units.
1. Formed Aluminum Sheet drip edge: Aluminum sheet, thickness as required to meet performance requirements.
 - a. Surface: Smooth, flat finish.
 - b. Finish: PVC Coated, color as selected from manufacturer's full range.

2.4 ROOF-EDGE DRAINAGE SYSTEMS

- A. Gutters: Manufactured in uniform section lengths not exceeding [12 feet], with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
1. Aluminum Sheet: Thickness as required to meet performance requirements.
- B. Downspouts: Plain rectangular complete with [mitered] elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Formed Aluminum: 0.063 inch thick.
- C. Splash Pans: Fabricate from the following exposed metal:
1. Stainless Steel: 0.019 inch (0.48 mm) thick.
- D. Aluminum Finish: Two-coat fluoropolymer.
1. Color: As selected by Architect from manufacturer's full range including premium colors.

2.5 UNDERLAYMENT MATERIALS

2.6 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.

- B. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
 - a. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- D. Coil-Coated Aluminum Sheet Finishes:
 - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
 - 1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
 - 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch (19 mm) for wood screws and other substrates not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.3 ROOF-EDGE SPECIALITIES INSTALLATION

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.4 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.

- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 30 inches apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
 - 1. Connect downspouts to downspout boots.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 71 00

SECTION 07 72 00 - ROOF ACCESSORIES

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. Equipment supports.
 - 2. Roof hatches.
 - 3. Ladder assist post.
- B. Related Sections:
 - 1. Section 05 50 00 "Metal Fabrications" for metal vertical ladders for access to roof hatches.
 - 2. Section 06 10 53 "Miscellaneous Carpentry" for wood blocking and plywood related to installation of hatch.

1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories.
 - 1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

- C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Required clearances.
- B. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: 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. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Wind-Restraint Performance: As indicated on Drawings.

2.2 EQUIPMENT SUPPORTS

- A. Equipment Supports: Rail-type metal equipment supports capable of supporting superimposed live and dead loads between structural supports, including equipment loads and other

construction indicated on Drawings, spanning between structural supports; capable of meeting performance requirements; with welded corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed structure-mounting flange at bottom.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Curbs Plus, Inc.
 - b. Roof Products and Systems (RPS); a division of Hart & Cooley, Inc.
 - c. Thybar Corporation.

- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

- C. Supported Load Capacity: Refer to Kitchen Equipment.

- D. Material: Aluminum sheet, 0.125 inch (3.17 mm) thick.
 1. Finish: Two-coat fluoropolymer or Baked enamel or powder coat.
 2. Color: White.

- E. Material: Stainless-steel sheet, thick.
 1. Finish: .

- F. Construction:
 1. Curb Profile: Manufacturer's standard compatible with roofing system.
 2. Insulation: Factory insulated with Nailer: Factory-installed continuous wood nailers 3-1/2 inches (90 mm) wide on top flange of equipment supports, continuous around support perimeter.
 3. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb of size and spacing required to meet wind uplift requirements.
 4. Platform Cap: Where portion of equipment support is not covered by equipment, provide weathertight platform cap formed from 3/4-inch (19-mm) thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
 5. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
 6. Fabricate equipment supports to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated.

2.3 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deck-mounting flange at perimeter bottom.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Babcock-Davis.
 - b. Bilco Company (The).
 - c. O'Keeffe's Inc.
 - d. Pate Company (The).
 - e. Precision Ladders, LLC.
- B. Type and Size: Single-leaf lid, 36 by 36 inches.
- C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.
- D. Hatch Material: Aluminum-zinc alloy-coated steel sheet.
1. Thickness: Manufacturer's standard thickness for hatch size indicated.
 2. Finish: Baked enamel or powder coat.
 3. Color: White.
- E. Construction:
1. Insulation: Cellulosic-fiber board or Glass-fiber board.
 - a. R-Value: 12.0 according to ASTM C 1363.
 2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
 3. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
 4. Fabricate curbs to minimum height of 8 inches above roofing surface unless otherwise indicated.
- F. Hardware: Spring operators, hold-open arm, stainless-steel spring latch with turn handles, stainless-steel butt- or pintle-type hinge system, and padlock hasps inside and outside.
- G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
1. Height: 42 inches above finished roof deck.
 2. Posts and Rails: Galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube, 1-5/8 inches in diameter.
 3. Flat Bar: Galvanized steel, 2 inches high by 3/8 inch thick.
 4. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches in diameter.
 5. .
 6. Self-Latching Gate: Fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
 7. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
 8. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
 9. Fabricate joints exposed to weather to be watertight.
 10. Fasteners: Manufacturer's standard, finished to match railing system.
 11. Finish: Manufacturer's standard.
 - a. Color: As indicated by manufacturer's designations.

- H. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder.
 - 1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
 - 2. Height: 42 inches above finished roof deck.
 - 3. Material: Steel tube.
 - 4. Post: 1-5/8-inch-diameter pipe.
 - 5. Finish: Manufacturer's standard baked enamel or powder coat.
 - a. Color: Safety Yellow.

2.4 METAL MATERIALS

- A. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 coated.
 - 1. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils.
 - 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.
- B. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- C. Steel Tube: ASTM A 500/A 500M, round tube.
- D. Galvanized-Steel Tube: ASTM A 500/A 500M, round tube, hot-dip galvanized according to ASTM A 123/A 123M.

2.5 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Cellulosic-Fiber Board Insulation: ASTM C 208, Type II, Grade 1, thickness as indicated.
- C. Glass-Fiber Board Insulation: ASTM C 726, nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F, thickness as indicated.
- D. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Roof Curb Installation: Install each roof curb so top surface is level.
- C. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
- D. Roof-Hatch Installation:
 - 1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
 - 2. Attach safety railing system to roof-hatch curb.
 - 3. Attach ladder-assist post according to manufacturer's written instructions.
- E. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 91 13 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 72 00

SECTION 07 81 00 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes sprayed fire-resistive materials.

1.2 DEFINITIONS

- A. SFRM: Sprayed fire-resistive materials.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Framing plans or schedules, or both, indicating the following:
 - 1. Extent of fireproofing for each construction and fire-resistance rating.
 - 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly. For structural steel beams which do not meet the minimum beam size specified by the referenced fire-resistance design, the thickness of the Spray Applied Fire Resistant Material (SFRM) shall be adjusted in accordance with the equations furnished in the Underwriters Laboratory Inc Directory "Fire Resistance Volume 1" based on the W/D ratio for the beams/column specified on the Contract Drawings. In no case shall the thickness of the SFRM be less than that specified by the referenced fire-resistance design.
 - 4. Treatment of fireproofing after application.
- C. Samples: For each exposed product and for each color and texture specified, **4 inches (102 mm)** square in size.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Product Certificates: For each type of fireproofing.

- C. Evaluation Reports: For fireproofing, from ICC-ES.
- D. Preconstruction Test Reports: For fireproofing.
- E. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. For structural beams and columns which do not meet the minimum beam size specified by the referenced fire-resistance design, the thickness of the SFRM shall be adjusted in accordance with equations furnished in the 2011 Underwriters laboratory Inc. Directory "Fire Resistance Volume 1" based on w/d ration for the beam/columns specified on the contract documents. In no case shall the thickness of the STEM be less than that specified by the referenced fire resistance design.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on fireproofing.
 - 1. Provide test specimens and assemblies representative of proposed materials and construction.
- B. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.
 - 1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - 2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - 3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
 - 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is **44 deg F (7 deg C)** or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

1.9 COORDINATION

- A. Notify Fire Marshal at least seven days in advance of applied fireproofing system installations; confirm dates and times on days preceding each series of installations.
- B. Do not cover up applied fireproofing system installations that will become concealed behind other construction until Fire Marshal, if required by State Fire Marshal, has examined each installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fireproofing from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- D. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

- A. Sprayed Fire-Resistive Material Refer to indicated UL Designs. Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application or conveyed in a dry state and mixed with atomized water at place of application.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Carboline Company; a subsidiary of RPM International.](#)
 - b. [GCP Applied Technologies Inc. \(formerly Grace Construction Products\).](#)
 - c. [Isolatek International.](#)
 - d. [Pyrok, Inc.](#)
 - e. [Schundler Company \(The\).](#)
 - 2. Application: Designated for exterior use by a qualified testing agency acceptable to authorities having jurisdiction.
 - 3. Bond Strength: Minimum **150-lbf/sq. ft. (7.18-kPa)** cohesive and adhesive strength based on field testing according to ASTM E 736.

4. Density: Not less than density specified in the approved fire-resistance design, according to ASTM E 605.
5. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than **0.375 inch (9 mm)**.
6. Combustion Characteristics: ASTM E 136.
7. 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: 10 or less.
 - b. Smoke-Developed Index: 10 or less.
8. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
9. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
10. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
11. Air Erosion: Maximum weight loss of **0.025 g/sq. ft. (0.270 g/sq. m)** in 24 hours according to ASTM E 859.
12. Finish: Spray-textured finish.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:
 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.
- C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and fireproofing manufacturer's written instructions. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.
- E. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.
- F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.
 - 1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
 - 2. Verify that objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 3. Verify that substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Verify that concrete work on steel deck is complete before beginning fireproofing work.
- C. Verify that roof construction, installation of rooftop HVAC equipment, and other related work are complete before beginning fireproofing work.
- D. Conduct tests according to fireproofing manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
 - 1. Masking Tape: Use masking tape to prevent materials of applied fireproofing system from contacting adjoin surfaces that will remain exposed on completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from applied fireproofing system materials. Remove tape as soon as possible without disturbing applied fireproofing system's bond with substrates.
- B. Clean substrates of substances that could impair bond of fireproofing.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of

fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
 - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Metal Decks:
 - 1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, is completed.
 - 2. Do not apply fireproofing to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fireproofing.
- E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- F. Spray apply fireproofing to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- G. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- I. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- J. Cure fireproofing according to fireproofing manufacturer's written instructions.
- K. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- L. Finishes: Where indicated, apply fireproofing to produce the following finishes:

1. Spray-Textured Finish: Finish left as spray applied with no further treatment.
2. .

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 1. Test and inspect as required by the IBC, as indicated on Schedule of Special Inspections.
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- C. Fireproofing will be considered defective if it does not pass tests and inspections.
 1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
 2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- D. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing is without damage or deterioration at time of Material Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 07 81 00

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
- B. Related Requirements:
 - 1. Section 07 84 43 "Joint Firestopping" for joints in or between fire-resistance-rated construction.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before installation of fire-resistance-rated assemblies and penetrating items, review through-penetration firestop system and examine procedures for ensuring quality of installed systems. Require representatives of each entity directly concerned with through-penetration firestop system to attend, including the following:
 - a. Contractor's superintendent.
 - b. Through-penetration firestop system Manufacturer's service representative.
 - c. Through-penetration firestop system Installer.
 - d. Fire-resistance-rated masonry Installer.
 - e. Fire-resistance-rated gypsum board assembly Installer.
 - f. Mechanical piping Installer.
 - g. HVAC ductwork Installer.
 - h. Electrical wireway Installer.
 - 2. Review inspection procedures for field quality control, through-penetration firestop system installation, and coordination of penetrating item configurations with available rated through-penetration firestop system assemblies.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.
- C. Notify Fire Marshal at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Fire Marshal, if required by State Fire Marshal, has examined each installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

- 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
- 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [3M Fire Protection Products](#).
 - b. [Hilti, Inc.](#)
 - c. [Specified Technologies, Inc.](#)
 - d. [Tremco, Inc.](#)
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg (2.49 Pa)**.
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg (2.49 Pa)**.
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- F. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- G. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- H. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, 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: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.
1. Self-adhering labels are not permitted.
 2. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Material Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 07 84 43 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Joints in or between fire-resistance-rated constructions.
- B. Related Requirements:
 - 1. Section 07 84 13 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for wall identification.
 - 2. Section 09 22 16 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

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. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.
- C. Notify Fire Marshal at least seven days in advance of joint firestopping system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up joint firestopping system installations that will become concealed behind other construction until Fire Marshal, if required by State Fire Marshal, has examined each installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."

2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint

firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [3M Fire Protection Products](#).
 - b. [Hilti, Inc.](#)
 - c. [Specified Technologies, Inc.](#)
 - d. [Tremco, Inc.](#)
 - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, 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: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
 - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within **6 inches (150 mm)** of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.

- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Material Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

END OF SECTION 07 84 43

SECTION 07 92 00 - 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. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 2. Exterior joints in horizontal traffic surfaces.
 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 4. Interior joints in horizontal traffic surfaces.

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. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in **1/2-inch- (13-mm-)** wide joints formed between two **6-inch- (150-mm-)** long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. 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 manufacturer and witnessed by a qualified testing agency.
- B. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

- C. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. 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. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with masonry substrates.
 - 4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
 - 5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
 - 7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

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: 10 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. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT. (ES-1)
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 790.
 - b. Pecora Corporation; 890.
 - c. Tremco Incorporated; Spectrem 1
 - 2.

- C. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, 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. (ES-2)
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 790.
 - b. Pecora Corporation; 864.
 - c. Tremco; Spectrem 2.
- D. Silicone, Nonstaining, S, NS, 100/50, T, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT. (ES-3)
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 890-SL.
 - b. Dow Corning Corporation; 890 (Gun grade).
 - c. Dow Corning Corporation; 890-SL.
 - d. Pecora Corporation; 300 Pavement Sealant (Self Leveling).
 - e. Pecora Corporation; 301 Pavement Sealant (Gun grade).

2.3 POLYURETHANE JOINT SEALANTS

- A. Polyurethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, polyurethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT. (ES-5)
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; Dynatrol I-XL.
 - b. Sika Corporation, Inc.; Sikaflex 15LMg
 - c. Tremco; DyMonic.
 - d. Tremco; Vulkem 921.
 - 2.
- B. Urethane, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Uses T and NT. (ES-6)
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Tremco; Vulkem 116.
 - b. Sika Corporation, Inc.; Sikaflex .1a.
 - c. Sonneborn; Sonolastic NP1.
- C. Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 25, Uses T and NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik Findley; Chem-Calk 550.
 - b. Pacific Polymers, Inc.; Elasto-Thane 227 High Shore Type I (Self Leveling).
 - c. Pacific Polymers, Inc.; Elasto-Thane 227 Type I (Self Leveling).
 - d. Pecora Corporation; Urexpan NR-200.

- e. Tremco; THC-901.
- f. Tremco; THC-900 , for ramps
- g. Tremco; Vulkem 245
- h. Pecora Corporation; Dynatread
- i. Pecora Corporation; Dynatrol II-SG.
- j. Sika Corporation, Inc.; Sikaflex - 2c SL.
- k. Sonneborn, Division of ChemRex Inc.; SL 2.

2.4 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT. (ES-4)
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 999.
 - b. Pecora Corporation; 898.
 - c. Tremco; Tremsil 600 White.

2.5 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF. (LS-1)
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; AC-20+.
 - b. 2. Sonneborn, Division of ChemRex Inc.; Sonolac.
 - c. 3. Tremco; Tremflex 834.

2.6 FLEXIBLE POLYURETHANE SECURITY SEALANTS

- A. Polyurethane Sealant: Comply with ASTM E119 (SS-1)
 - 1. Products:
 - a. Pecora "Dynaflex SC"
 - b. Sika Sikaflex-11FC
 - c. BASF MasterSeal CR195
 - 2. Accessories:
 - a. Provide manufacturer's standard primers
 - b. Provide manufacturer's standard tested backing material for joints in rated construction

2.7 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints AS-1: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. (AS-1)

1. Products:
 - a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
 - b. Henkel: OSI Pro-Series SC-175.
 - c. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - d. United States Gypsum Co.; SHEETROCK Acoustical Sealant.

- B. Acoustical Sealant for Concealed Joints AS-2: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission. (AS-2)

1. Products:
 - a. Henkel: OSI Pro-Series SC-170.
 - b. Pecora Corporation; BA-98.
 - c. Tremco; Tremco Acoustical Sealant.

2.8 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) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.9 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.
 - d. Exterior insulation and finish systems.
 - 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. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. 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.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. 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.
- G. 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.
 - a. Use masking tape to protect surfaces adjacent to tooled joints.

3.4 CLEANING

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

3.5 PROTECTION

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

3.6 EXTERIOR JOINT-SEALANT SCHEDULE

- A. Cast-in-place concrete, vertical construction joints:
 - 1. ES-2 Single-component neutral-curing silicone sealant.
- B. Cast-in-place concrete slabs, horizontal nontraffic and traffic isolation and contraction joints:
 - 1. ES-3 Single-component pourable neutral-curing silicone sealant.
- C. Unit masonry, vertical control and expansion joints:
 - 1. ES-2 Single-component neutral-curing silicone sealant.
- D. Exterior vertical joints between different materials listed above:
 - 1. ES-2 Single-component neutral-curing silicone sealant.
- E. Exterior perimeter joints between materials listed above and frames of doors windows and louvers.
 - 1. ES-2 Single-component neutral-curing silicone sealant.
- F. Exterior control and expansion joints in ceilings and other overhead surfaces.
 - 1. ES-2 Single-component neutral-curing silicone sealant.
- G. Exterior control and expansion joints in horizontal traffic surfaces of unit pavers:
 - 1. ES-3 Single-component pourable neutral-curing silicone sealant.
- H. Other vertical or horizontal non-traffic joints:
 - 1. ES-2 Single-component neutral-curing silicone sealant.
- I. Other exterior horizontal traffic joints:
 - 1. ES-3 Single-component pourable neutral-curing silicone sealant.

3.7 INTERIOR JOINT SEALANT SCHEDULE

- A. Vertical control and expansion joints on exposed interior surfaces of exterior walls.
 - 1. SS1 Polyurethane Sealant.
- B. Vertical joints on exposed surfaces of interior unit masonry walls and partitions:
 - 1. SS1 Polyurethane Sealant
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

- C. Interior perimeter joints of exterior openings.
 - 1. ES-2 Single-component neutral-curing silicone sealant.

- D. Interior ceramic and dimension stone tile expansion, control, contraction, and isolation joints in horizontal traffic surfaces.
 - 1. ES-6 Single-component urethane sealant.

- E. Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
 - 1. ES-4 Single-component mildew-resistant neutral -curing silicone sealant.

- F. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
 - 1. LS-1 Latex sealant.
 - 2. Joint-Sealant Color: Paintable white.

- G. Other non-dynamic interior joints including between interior wall surfaces and casework.
 - 1. LS-1 Latex sealant.
 - 2. Joint-Sealant Color: Clear.

- H. Acoustical interior joints for exposed joints.
 - 1. AS-1 Latex sealant.

- I. Acoustical interior joints for concealed joints.
 - 1. AS-2 Latex sealant.

END OF SECTION 07 92 00

SECTION 08 11 13 - 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. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Windstorm Rated hollow metal doors and frames.
4. Louvers installed in hollow metal doors.
5. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Flush Wood Doors".
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors".
4. Division 08 Section "Door Hardware".
5. Division 08 Section "Access Control Hardware".
6. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
7. Division 09 Sections "Non-Structural Metal Framing".
8. Division 09 Sections "Gypsum Board".
9. Division 26 "Electrical".
10. Division 27 "Communications".
11. Division 28 "Electronic Security and Safety".

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
17. IBC 2012.
18. ASCE7-10, Minimum Design Loads for Buildings and Other Structures.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
 1. Elevations of each door design.
 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 anchorages, joints, field splices, and connections.
 6. Details of accessories.
 7. Details of moldings, removable stops, and glazing.
 8. Details of conduit and preparations for power, signal, and control systems.
 9. Electrical Elevations for frames requiring prewire for the specified cables in Section 08 71 00.
- D. Samples for Verification:
 1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with one removable shipping spreader bars across bottom of frames, tack welded to jambs and mullions. The shipping spreader shall be removed prior to setting the frame.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 COORDINATION

- A. Coordinate installation of anchorages 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.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CECO Door Products.
 - 2. Curries Company.
 - 3. Steelcraft.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
- B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for Level 3 and Model 2 Seamless and ANSI/SDI A250.4 for physical performance level:
 - 1. Design: Flush panel, seamless edges.
 - 2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.4.
 - 3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
 - 4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.

5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
 6. Door Gauge: 16 gauge cold rolled steel, A60 galvanized, seamless.
 7. Windload: Provide doors meeting the manufacturer's assembly testing for the buildings static design pressures for exterior components and cladding. These are minimum gauge requirements. However, this does not relieve the supplier from complying with the structural requirements with respect to the buildings static design pressures. Refer to the structural specifications and drawings for those requirements and provide the required gauge and door construction to meet those requirements, and provide the required gauge and door construction to meet those requirements.
 - 8.
- C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for Level 2 and Model 2 Seamless and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel, seamless edges.
 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
 3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
 4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
 6. Door Gauge: 18 gauge cold rolled steel, seamless.
- D. Manufacturers Basis of Design:
1. Curries Company 707 Series.
 2. Curries Company Temperature Rise, where required by Code: 727.

2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
1. Fabricate frames with die mitered interlocked corners.
 2. Frames shall be continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
 3. All frames shall be 14 gauge cold rolled steel.
 4. Exterior frames shall be a minimum A60 galvanized.
 5. Windload: Provide frames meeting the manufacturer's assembly testing for the buildings static design pressures for exterior components and cladding. These are minimum gauge requirements. However, this does not relieve the supplier from complying with the structural requirements with respect to the buildings static design pressures. Refer to the structural specifications and drawings for those requirements.
 6. Manufacturers Basis of Design:

a. Curries Company M Series.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with die mitered interlocked corners.
2. Frames shall be continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
4. Frames for openings up to 48 inches in width: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.]
5. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
6. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
7. Manufacturers Basis of Design:

a. Curries Company M Series (Masonry Profile).

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: T-shaped anchors to suit frame size, formed from A60 metallic coated material, 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.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick, welded in flush stud type.
3. Windstorm Opening Anchors: Types as tested and required for indicated wall types to meet specified wind load design criteria.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 HOLLOW METAL FRAME AND DOOR CABLES

A. Coordinate the frame and door cables specified in section 08 71 00 with the hollow metal door and frames.

1. Frames: Frames shall have electrical boxes covering the locations of the current transfer devices (QC Hinges) and the Door Position Switches (3287) locations where specified in 087100. ½" Rigid conduit shall be attached to each of these boxes. This conduit shall extend 6" above the finished frame height. Cables shall be preinstalled into the hollow metal frames at these locations prior to delivering the frames to the project site. 4" cable lengths with associated Molex connections (QC Locations) shall be secured to the exposed stop of the frame. The balance of the cable length shall be neatly coiled as it

exits the 6" conduit stub out of the top of the frame (Fig 1). The excess cable shall be neatly coiled and polybagged, then nested inside the header of the frame for deliver to the site. At all locations, where the conduit mechanically connects to the hollow metal frame electrical cover boxes, these joints shall be provided with a watertight seal.

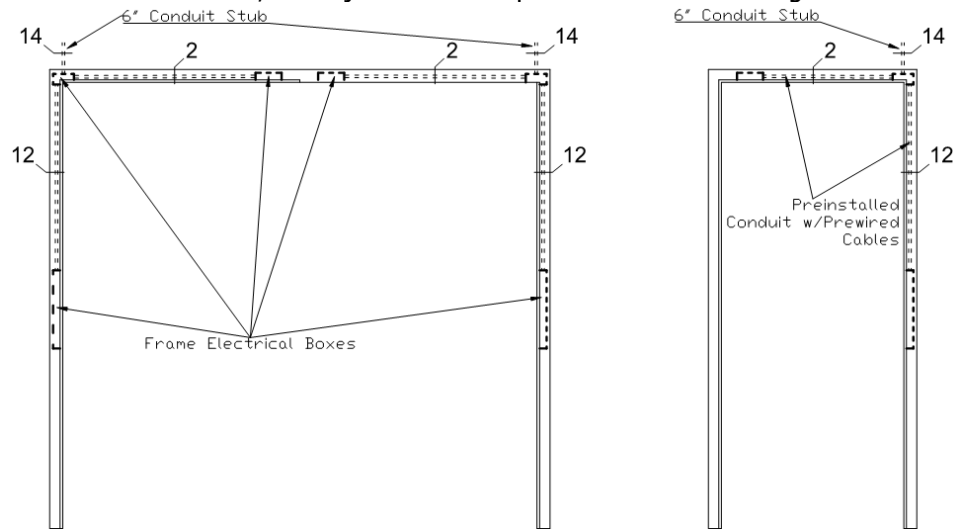


Figure 1.

2. Doors: Specified door cables in section 08 71 00 shall be installed by the door manufacturer during the manufacturing process. Cables shall be nested inside the fabricated electrical pockets of the doors.
3. Elevations: Review the electrical drawings for elevation drawings of pathways to be provided.

2.7 LOUVERS

- A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.
 1. Blade Type: Vision proof inverted V or inverted Y.
 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.
- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
 1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.8 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed

and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed. Provide pockets in Lites suitable for the glass thickness specified in Division 08 Section "Glazing".
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.9 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.10 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
 - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit.
 - 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" 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.
 - 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:
 - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with one steel spreader temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used as a setting spreader to size the frame opening. The shipping spreader must be removed prior to setting the frame.
 3. Sidelight 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 butt welding.
 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 5. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 6. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 7. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 8. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry 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) 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 1 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 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
 9. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware".
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.11 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

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. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- 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. Shipping spreaders are never to be used as setting spreaders.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
1. Remove shipping spreaders from the frames. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

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 and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid core doors with wood veneer, hardboard or MDF faces.
2. Factory finishing wood doors.
3. Factory fitting wood doors to frames and factory machining for hardware.
4. Louvers installed in flush wood doors.
5. Light frames and glazing installed in wood doors.

B. Related Sections:

1. Division 08 Section "Hollow Metal Doors and Frames" for wood doors in steel frames.
2. Division 08 Section "Glazing" for glass view panels in wood doors.
3. Division 08 Section "Door Hardware" for door hardware for flush wood doors and wood frames.
4. Division 26 "Electrical".
5. Division 27 "Communications".
6. Division 28 "Electronic Security and Safety".

C. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A208.1 – Wood Particleboard.
2. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
3. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
4. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
5. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
6. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, trim for openings, and WDMA I.S.1-A or AWS classifications. Include factory finishing specifications.

- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the wood door supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
 - 4. Indicate doors to be factory finished and finish requirements.
 - 5. Indicate fire protection ratings for fire rated doors.
- D. Samples for Initial Selection: For factory finished doors.
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
 - 2. Corner sections of doors, 8 by 10 inches, with door faces and edges representing actual materials to be used.
 - a. Provide samples for each species of veneer and solid lumber required.
 - b. Finish veneer faced door samples with same materials proposed for factory finished doors.
 - 3. Frames for light openings, 6 inches long, for each material, type, and finish required.
- E. Warranty: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors'.
- C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C (neutral pressure testing according to UL 10B where specified).
 - 1. Blocking: Indicate size and location of blocking in 45, 60 and 90 minute mineral core doors.
- D. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and

Contractor to review proper methods and procedures for receiving, handling, and installing flush wood doors.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package pre-finished doors individually in plastic bags or cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3-inch span.
 - c. Telegraphing of core construction and delaminating of face in decorative laminate-faced doors.
 - 2. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid Core Interior Doors: Life of installation according to manufacturer's written warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with the requirements, provide products by one of the following:
 - 1. Algoma Hardwoods, Inc.
 - 2. Graham Wood Doors; an Assa Abloy Group company.
 - 3. Marshfield Door Systems, Inc.; a Division of Masonite Architectural Door Systems.

2.2 DOOR CONSTRUCTION – GENERAL

- A. WDMA I.S.1-A Performance Grade: Heavy Duty; Aesthetic Grade: Premium.
- B. Fire Rated Doors: Provide construction and core as needed to provide fire ratings indicated.
 - 1. Category A Edge Construction: Provide fire rated door edge construction with intumescent seals concealed by outer stile (Category A) at 45, 60, and 90 minute rated doors. Comply with specified requirements for exposed edges.
 - 2. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

2.3 CORE CONSTRUCTION

- A. Particleboard Core Doors:
 - 1. Particleboard: Wood fiber based materials complying with ANSI A208.1 Particleboard standard, WDMA Performance Duty Level; Heavy Duty.
 - 2. Adhesive: Per requirements of WDMA I.S. 1A, C-6.
 - 3. Basis of Design:
 - a. Algoma: Novodor
 - b. Graham: GPD, PC5
 - c. Marshfield: DPC
- B. Mineral Core Doors:
 - 1. Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
 - 2. Edge Construction: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 3. Basis of Design:
 - a. Graham GPD-FD.
 - b. Marshfield DFM.

2.4 VENEERED DOORS FOR TRANSPARENT FINISH

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Graham: GPD
 - 2. Marshfield: Signature Series
 - 3. Algoma: Novodor

B. Interior Solid Core Doors:

1. Assembly of Veneer Leaves on Door Faces:
 - a. Match: Center Balanced Match.
 - b. Species: Plain Sliced White Birch.
 - c. Grade: Grade A.
2. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
3. Transom Match: Continuous match.
4. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.
5. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors
6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.
7. At doors over 40% of the face cut-out for lights and or louvers, furnish engineered composite lumber core.

2.5 LOUVERS

- A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.
 1. Blade Type: Vision proof inverted V or inverted Y.
 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish.
- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
 1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish.

2.6 LIGHT FRAMES AND GLAZING

- A. Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated.
- B. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.

2.7 FABRICATION

- A. Factory fit doors to suit frame opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire rated doors.
- B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.
- C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
- D. Openings: Cut and trim openings through doors in factory.
 - 1. Light Openings:
 - a. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048 inch thick, cold rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated.
 - 2. Glazing: Comply with applicable requirements in Division 08 Section "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.
- E. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable. Provide factory installed cables where specified in 087100.

2.8 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Transparent Finish: Provide a clear protective coating over the wood veneer allowing the natural color and grain of the selected wood species to provide the appearance specified. Stain is applied to the wood surface underneath the transparent finish to add color and design flexibility.
 - 1. Grade: Premium.

2. Finish: Meet or exceed WDMA I.S. 1A TR6 Catalyzed Polyurethane finish performance requirements.
3. Staining: As selected by Architect from manufacturer's full range.
4. Sheen: Satin.
5. Color: As selected from the manufacturers standard color offering.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 1. Install fire rated doors in corresponding fire rated frames according to NFPA 80.
- C. Factory Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

SECTION 08 14 33 - STILE AND RAIL WOOD DOORS

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 stile and rail wood doors.
 - 2. Fitting stile and rail wood doors to frames and machining for hardware.
- B. Related Requirements:
 - 1. Section 06 40 23 "Interior Architectural Woodwork" for frame materials and lumber and plywood grades and species.
 - 2. Section 099123 "Interior Painting" for field finishing stile and rail doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include details of construction.
 - 2. Include factory-finishing specifications.
- B. Shop Drawings: For stile and rail wood doors. Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data, including those for stiles, rails, panels, and moldings (sticking); and other pertinent data, including the following:
 - 1. Locations and dimensions of mortises and holes for hardware.
 - 2. Undercuts.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification: Corner sections of doors, approximately 8 by 10 inches, with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in opaque plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.
- B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 17 and 50 percent during remainder of construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship, or have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, within specified warranty period.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
 - a. Interior Doors: One year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain stile and rail wood doors from single manufacturer.

2.2 MATERIALS

- A. General: Use only materials that comply with referenced standards and other requirements specified.
 - 1. Assemble interior doors, including components, with either dry-use or wet-use adhesives complying with ASTM D 5572 for finger joints and with ASTM D 5751 for joints other than finger joints.
- B. Panel Products: Any of the following unless otherwise indicated:
 - 1. Veneer-core plywood.

2.3 INTERIOR STILE AND RAIL WOOD DOORS

- A. Interior Stile and Rail Wood Doors Type SR: Interior custom doors complying with requirements specified.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. MW Millworks, (843) 746-8540
 - b. Sundog Millworks, (912) 313-1311
 - c. Architectural Millworks (912) 236-1870
 2. Panel Designs: Indicated on Drawings. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
 3. Grade: Custom.
 4. Finish: Opaque.
 5. Door Construction for Opaque Finish:
 - a. Stile and Rail Construction: Clear softwood; may be edge glued for width and finger jointed.
 - b. Flat-Panel Construction: Plywood.
 6. Stile and Rail Widths: As indicated.
 7. Stile and Rail thickness: 1 3/4"
 8. Flat-Panel Thickness: 1/2 inch.
 9. Molding Profile (Sticking): Match existing first floor stile and rail doors..

2.4 STILE AND RAIL WOOD DOOR FABRICATION

- A. Fabricate stile and rail wood doors in sizes indicated for field fitting.
- B. Coordinate with hardware requirements detailed at 08 71 00 "Door Hardware".
1. Machine groove in edges of doors shown as "AC" access control
 - a. Install required wiring and close groove with filler piece.
 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 3/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 3/8 inch from bottom of door to top of threshold unless otherwise indicated.
 - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 33

SECTION 08 33 26 - OVERHEAD COILING GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Open-curtain overhead coiling grilles.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports, angle-framing of grille opening, corner guards, and bollards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling grille and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for curtain components, and finishes.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Show locations of controls, locking devices, and other accessories.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Open-curtain grille with full-size components consisting of rods, spacers, and links as required to illustrate each assembly.
 - 2. Guides.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling grilles 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 for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain overhead coiling grilles from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Overhead coiling grilles shall withstand the effects of earthquake motions determined according to Structural Drawings.

2.3 OPEN-CURTAIN GRILLE ASSEMBLY

- A. Open-Curtain Grille: Overhead coiling grille with a curtain having a network of horizontal rods that interconnect with vertical links.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:

- a. [Cookson Company.](#)
- b. [Cornell Iron Works, Inc.](#)
- c. [Dynaflair Corporation.](#)
- d. [McKeon Rolling Steel Door Company, Inc.](#)
- e. [Overhead Door Corporation.](#)

- B. Operation Cycles: Grille components and operators capable of operating for not less than 20,000. One operation cycle is complete when a grille is opened from the closed position to the fully open position and returned to the closed position.

- C. Grille Curtain Material: Aluminum.

1. Rod Spacing: Approximately 2 inches o.c.
2. Link Spacing: Approximately 6 inches apart in a straight in-line pattern.

3. Spacers: Metal tubes matching curtain material.
- D. Curtain Jamb Guides: Aluminum with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.
- E. Hood: Aluminum.
 1. Shape: Round.
 2. Mounting: Face of wall and above ceiling.
- F. Locking Devices: Equip grille with locking device assembly.
 1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumb turn outside with cylinder.
- G. Manual Grille Operator: Push-up operation.
- H. Curtain Accessories: Equip grille with push/pull handles.
- I. Grille Finish:
 1. Aluminum Finish: Clear anodized.

2.4 GRILLE CURTAIN MATERIALS AND CONSTRUCTION

- A. Open-Curtain Grilles: Fabricate metal grille curtain as an open network of horizontal rods, spaced at regular intervals, that are interconnected with vertical links, which are formed and spaced as indicated and are free to rotate on the rods.
 1. Aluminum Grille Curtain: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Bottom Bar: Manufacturer's standard continuous shape unless otherwise indicated, finished to match grille.
 1. Astragal: Equip grille bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.
- C. Grille Curtain Jamb Guides: Manufacturer's standard shape having curtain groove with return lips or bars to retain curtain. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise; with removable stops on guides to prevent overtravel of curtain.

2.5 HOODS AND ACCESSORIES

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging. **Hood shall be installed above ceiling.**

1. Aluminum: 0.040-inch- thick aluminum sheet, complying with ASTM B 209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.
- B. Removable Metal Soffit: Formed or extruded from same metal and with same finish as curtain if hood is mounted above ceiling, unless otherwise indicated.
- C. Push/Pull Handles: Equip push-up-operated or emergency-operated grille with lifting handles on each side of grille, finished to match grille.

2.6 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
 2. Keys: Three for each cylinder.

2.7 COUNTERBALANCING MECHANISM

- A. General: Counterbalance grilles by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- C. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- D. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.8 MANUAL GRILLE OPERATORS

- A. General: Equip grille with manual grille operator by grille manufacturer.
- B. Push-up Grille Operation: Lift handles and pull rope for raising and lowering grille, with counterbalance mechanism designed so that required lift or pull for grille operation does not exceed 25 lbf.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Design Professionalural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Install overhead coiling grilles and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports, according to manufacturer's written instructions and as specified.

3.3 STARTUP SERVICE

- A. Perform installation and startup checks according to manufacturer's written instructions.
- B. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly, so that grilles operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling grilles.

END OF SECTION 08 33 26

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior and interior storefront framing.
2. Exterior and interior manual-swing entrance doors.

B. Related Requirements:

1. Section 08 80 00 "Glazing" for glazing installed in Aluminum Storefronts
2. Section 08 71 00 "Door Hardware" for Door Hardware not specified under this heading.

1.2 PREINSTALLATION MEETINGS

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

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 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.
3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
4. Show all electrified devices mounted in frames and doors in detail along with the associated mounting brackets used for their connection and attachment to the associated door and frame.

- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- G. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 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 or 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.
- B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

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.
- C. Structural-Sealant Glazing (SF3): Comply with ASTM C 1401 for design and installation of storefront systems.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
 - 3. Mock-Up: Provide a one half scale mock-up assembly for opening 1411.1. All materials, profiles and joints to be used on the project shall be incorporated into the mock-up. This unit will be turned over to the Architects Consultant for prewiring. This will be used as the template for the prewire requirements for all frames receiving access controlled devices.
 - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 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 and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 2. Warranty Period: Five 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: Five years from date of Substantial Completion.

1.10 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 Material 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. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.
 3. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.11 ALLOWANCES

- A. Provide the sum of \$1500.00 for the Architects selection of a EAC Consultant to review all electrified opening submittal documents, 1/2 Scale Mock-Up Prewire review, and field inspection of prewired frames in place.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- 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, story drift, 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 indicated on Drawings.
 - 2. Seismic Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
 - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- E. Structural: Test according to ASTM E 330 as follows:
 - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including 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.
- F. 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 1.57 lbf/sq. ft..
 2. Entrance Doors:
 - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
 - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
 - G. 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 when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
 - H. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - I. Energy Performance: Certify and label energy performance according to NFRC as follows:
 1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.50 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.25 as determined according to NFRC 200.
 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 53 as determined according to NFRC 500.
 - J. 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.
 - K. Structural-Sealant Joints (SF03):
 1. Designed to produce tensile or shear stress of less than 20 psi (138 kPa).
 - L. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed storefront system without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
 1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.
- 2.2 MANUFACTURERS
- A. **Storefront Type SF1:** Basis-of-Design Product: Subject to compliance with requirements, provide YKK YHS 40 FS Center Set storefront framing system or comparable product by one of the following:

1. Kawneer North America; an Alcoa company.
 2. Oldcastle Building Envelope
 3. YKK AP America Inc.
- B. **Storefront Type SF2:** Basis-of-Basis-of-Design Product: Subject to compliance with requirements, provide YKK YHS 45 TU storefront framing system with or comparable product by one of the following:
1. Kawneer North America; an Alcoa company.
 2. Oldcastle Building Envelope
 3. YKK AP America Inc
- C. **Storefront Type SF3:** Basis-of-Design Product: Subject to compliance with requirements, at interior openings, provide YKK YES 50 TU storefront framing or comparable product by one of the following:
1. Kawneer North America; an Alcoa company.
 2. Oldcastle Building Envelope
 3. YKK AP America Inc
- D. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken at Type SF2, Nonthermal at Types SF1 and SF3.
 2. Glazing System: At Types SF1 and SF2, Retained mechanically with gaskets on four sides
At Type SF3, Retained mechanically with gaskets on two sides and structural sealant on two sides.
 3. Glazing Plane: As Indicated.
 4. Finish: High-performance organic finish.
 5. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 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.

2. Steel Reinforcement: 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.
 - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

A. Basis-of-Design Products:

1. At Storefront Types SF1 and SF2, provide YKK AP America Inc; 50D Entrances or a comparable product by one of the following.
 - a. Kawneer North America; an Alcoa company.
 - b. Oldcastle Building Envelope™
2. Provide nonremovable glazing stops on outside of door.

B. Basis-of-Design Products:

1. At Storefront Type SF3, provide YKK AP America Inc; 50H Entrances wet glaze system or a comparable product by one of the following.
 - a. Kawneer North America; an Alcoa company.
 - b. Oldcastle Building Envelope™
2. Provide nonremovable glazing stops on outside of door.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."

B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule and entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article for each entrance door to comply with requirements in this Section.

1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
3. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbfto set the door in motion and not more than 15 lbf to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

C. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.
- E. Removable Mullions: BHMA A156.3, extruded aluminum.
1. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.
- F. Weather Stripping: Manufacturer's standard replaceable components.
1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
- G. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- H. Silencers: BHMA A156.16, Grade 1.
- I. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 GLAZING

- A. Glazing: Comply with Section 08 80 00 "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.
- D. Structural Glazing Sealants (SF3): ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront system indicated.
 1. Color: As selected by Architect from manufacturer's full range of colors.

2.7 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 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: Dead-soft, 0.018-inch- thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.8 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 exterior doors, provide compression weather stripping at fixed stops.
 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- 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.

2.9 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF or FEVE resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
1. Color and Gloss: As indicated by manufacturer's designations.

2.10 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 PREPARATION

- A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 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. At exterior locations. set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install glazing as specified in Section 08 80 00 "Glazing."
- F. 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.

3.4 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.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will 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: At exterior storefront, 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 three tests in areas as directed by Architect.
- C. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.
 - 1. Test a minimum of two areas at Storefront type SF3..
 - 2. Repair installation areas damaged by testing.
- D. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.6 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 08 41 13

SECTION 08 44 13 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes glazed aluminum curtain walls.
- B. Related Requirements:
 - 1. Section 06 10 53 "Miscellaneous Carpentry" for wood blocking.
 - 2. Section 07 92 00 "Joint Sealants" for installation of joint sealants installed with glazed aluminum curtainwall systems and for sealants to the extent not specified in this section.
 - 3. Section 08 41 13 "Aluminum-framed Entrances and Storefronts" for entrance and storefront systems.
 - 4. Division 08 80 00 "Glazing" for insulating-glass requirements.

1.3 PREINSTALLATION MEETINGS

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

1.4 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 glazed aluminum curtain walls. 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 vertical-to-horizontal intersection of glazed aluminum curtain walls, 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.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
 1. Joinery, including concealed welds.
 2. Anchorage.
 3. Expansion provisions.
 4. Glazing.
 5. Flashing and drainage.
- F. Delegated-Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For glazed aluminum curtain walls, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.
- B. Maintenance Data for Structural Sealant: For structural-sealant-glazed curtain walls to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.7 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 Design Professional, except with Design Professional's approval. If changes are proposed, submit comprehensive explanatory data to Design Professional for review.

1.8 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 1. Build mockup of typical wall area as shown on Drawings.
 2. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Design Professional specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.9 WARRANTY

- A. Special Assembly Warranty: Manufacturer agrees to repair or replace components of glazed aluminum curtain wall 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 to function normally.
 2. Warranty Period: Two years from date of Material 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: Five years from date of Material Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazed aluminum curtain walls.
- B. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, 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 indicated on Drawings.
 - 2. Other Design Loads: Seismic Category and Importance Factor: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to $1/175$ of clear span for spans up to 13 feet 6 inches and to $1/240$ of clear span plus $1/4$ inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to $3/4$ inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to $[1/360$ of clear span or $1/8$ inch, whichever is smaller.
- E. Structural: Test according to ASTM E 330 as follows:
 - 1. Submit reports of tests performed on Manufacturer's standard assemblies.
 - 2. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 - 3. When tested at 150percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2percent of span.
 - 4. Test Durations: As required by design wind velocity, but not less than 60 seconds.
- F. 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..

- G. 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 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.
 2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation]. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- H. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- I. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.69 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.45 as determined according to NFRC 200.
 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.
- J. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows:
1. Outdoor-Indoor Transmission Class: Minimum 26.
- K. 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.

2.2 MANUFACTURERS

- A. Source Basis of Design: Subject to compliance with requirements provide YKK YCW 752 with 2" sightline or comparable products by one of the following:
1. Kawneer North America, an ALCOA Company
 2. Oldecastle BuildingEnvelope
- B. Source Limitations: Obtain all components of curtain wall system, including framing entrances and accessories, from single manufacturer. Obtain Aluminum Storefront and Entrance Systems from same manufacturer as Curtainwall systems.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Glazing System: Retained mechanically with gaskets on four sides. Glazing Plane: Front.
 2. Finish: High-performance organic finish.
 3. Fabrication Method: Field-fabricated stick system.

- B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
 - 1. Include snap-on aluminum trim that conceals fasteners.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
 - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 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.
 - d. Structural Profiles: ASTM B 308.
 - 2. Steel Reinforcement: 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.
 - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCES

- A. Entrances: Comply with Section 08 41 13 "Aluminum-Framed Entrances and Storefronts."

2.5 GLAZING

- A. Glazing: Comply with Section 08 80 00 "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.

2.6 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.

- 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 complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 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.

2.8 ALUMINUM FINISHES

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

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. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal 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 primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

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

E. Install glazing as specified in Section 08 80 00 "Glazing."

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet.
2. Level: 1/8 inch in 20 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: Architect will engage] a qualified testing agency to perform tests and inspections.

- B. Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows. Do not process with installation of next area until test results for previously completed areas show compliance with requirements.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Design Professional shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of two tests in areas as directed by Design Professional.
- C. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 08 44 13

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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

- B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Cylinders specified for doors in other sections.

- C. Related Sections:

1. Division 06 Section "Rough Carpentry".
2. Division 06 Section "Finish Carpentry".
3. Division 08 Section "Operations and Maintenance".
4. Division 08 Section "Door Hardware Schedule".
5. Division 08 Section "Hollow Metal Doors and Frames".
6. Division 08 Section "Interior Aluminum Doors and Frames".
7. Division 08 Section "Flush Wood Doors".
8. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
9. Division 08 Section "All-Glass Entrances".
10. Division 08 Section "Access Control Hardware".
11. Division 26 "Electrical".
12. Division 27 "Communications".

- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure difference.
3. ASTM E1996 - Standard specification for performance of exterior windows, curtain walls, doors and storm shutters impacted by Windborne Debris in Hurricanes.
4. ICC/IBC - International Building Code.

5. NFPA 70 - National Electrical Code.
6. NFPA 80 - Fire Doors and Windows.
7. NFPA 101 - Life Safety Code.
8. NFPA 105 - Installation of Smoke Door Assemblies.
9. TAS-201-94 - Impact Test Procedures.
10. TAS-202-94 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components using Uniform Static Air Pressure.
11. TAS-203-94 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
12. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of

other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Proof of Certification: Provide copy of manufacturer(s) official certification or accreditation document indicating proof of status as a qualified and authorized provider of the primary Integrated Wiegand Access Control Products.
- E. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- F. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- G. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 15 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 10 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this

Project and whose work has resulted in construction with a record of successful in-service performance.

- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 25 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Integrated Wiegand, Wireless, and IP-Enabled Access Control Products Supplier Qualifications: Integrated access control products and accessories are required to be supplied and installed through current members of the ASSA ABLOY "Authorized Channel Partner" (ACP) and "Certified Integrator" (CI) programs. Suppliers are to be factory trained, certified prior to project bid, and a direct purchaser of the specified product. Installers are to be factory trained, certified prior to project bid, and are responsible for commissioning, servicing, and warranting the installed equipment specified for the project.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Hurricane Resistant Exterior Openings: Provide exterior door hardware as complete and tested assemblies, or component assemblies, including approved doors and frames specified under Section 081113 "Hollow Metal Doors and Frames", to meet the wind loads, design pressures, debris impact resistance, and glass and glazing requirements applicable to the Project.
 - 1. Test units according to ASTM E330, ASTM E1886, ASTM E1996 standards, certified by a qualified independent third party testing agency acceptable to authority having jurisdiction, and bearing a third party certification agency permanent label indicating windstorm approved product.
- G. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- H. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage.
 - 4. Address and requirements for delivery of keys.

- I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- J. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. 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. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Twenty five years for manual surface door closer bodies.
 - 4. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

- A. 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 door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
- C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

Acceptable Manufacturers:

- a. Bommer Industries (BO).
 - b. McKinney Products (MK).
 - c. Stanley Hardware (ST).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Acceptable Manufacturers:
 - a. Ives (IV).
 - b. McKinney Products (MK).
 - c. Pemko Manufacturing (PE).

2.3 POWER TRANSFER DEVICES

- A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Acceptable Manufacturers:
 - a. Bommer Industries (BO) – ETW12 Option.
 - b. Hager Companies (HA) - ETW-QC (# wires) Option.
 - c. McKinney Products (MK) - QC (# wires) Option.

- B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Acceptable Manufacturers:
 - a. Securitron (SU) - EL-CEPT Series.
 - b. Stanley Hardware (ST) EPT-12C Series.
 - c. Von Duprin (VD) - EPT-12 Series.

2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 1. Manual flush bolts to be furnished with top rod of sufficient length to allow bolt location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 5. Provide windstorm rated flush bolts where specified.
 6. Acceptable Manufacturers:
 - a. Door Controls International (DC).

- b. Rockwood Manufacturing (RO).
 - c. Trimco (TC).
- B. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
- 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 - 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 - 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 - 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 - a. Acceptable Manufacturers:
 - 1) Ives (IV).
 - 2) Rockwood Manufacturing (RO).
 - 3) Trimco (TC).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- 1. Acceptable Manufacturers:
 - a. Sargent Manufacturing (SA).
 - b. No Substitution.
- C. Cylinders: Original manufacturer cylinders complying with the following:
- 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 4. Keyway: Coordinate with Sargent's keying department.
- D. Security Cylinders: ANSI/BHMA A156.5, Grade 1, patented security cylinders and keys able to be used together under the same facility master or grandmaster key system. Cylinders are to be factory keyed.
- 1. Acceptable Manufacturers:

- a. Sargent Manufacturing (SA) - Signature Series.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Key locks to Owner's existing system.
- F. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Change: Five (5).
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys: Ten (10).
- G. Construction Keying: Provide construction keyed cylinders.
- H. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.
- I. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
 - 1. Acceptable Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
 - 1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) – ML2000 Series.
 - b. Sargent Manufacturing (SA) – 8200 Series.
 - c. Yale Locks and Hardware (YA) – 8800FL Series.
- B. Lock Trim Design: As specified in Hardware Sets.

2.7 INTEGRATED WIEGAND OUTPUT ACCESS CONTROL LOCKING DEVICES

- A. Integrated Wiegand Output Mortise Locks: Wiegand output ANSI A156.13, Grade 1, mortise lockset with integrated proximity card reader, request-to-exit signaling, door position status switch, and latchbolt monitoring in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim, 3/4" deadlocking anti-friction latch, and 1" case-hardened steel deadbolt. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.
1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Latchbolt monitoring and door position switch act in conjunction to report door-in-frame (DPS) and door latched (door closed and latched) conditions.
 2. Reader supports either HID 125 kHz proximity (up to 39 bits, including Corporate 1000) credentials.
 3. 12VDC external power supply required for reader and lock, with optional 24VDC electrified load as specified. Fail safe or fail secure options as specified.
1. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
2. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
 3. Installation to include manufacturer's access control panel interface board or module where required for Wiegand output protocol.
 - a. Acceptable Manufacturers:
 - 1) Corbin Russwin Hardware (RU) - Access 600 - ML20600 RNE1 Series.
 - 2) Sargent Manufacturing (SA) - Harmony - H1/H2 8200 Series.
 - 3) Yale Locks and Hardware (YA) - Symphony - S8800 SYM Series.

2.8 AUXILIARY LOCKS

- A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.5, Grade 1, certified small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.
1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DL4100 Series.
 - b. Sargent Manufacturing (SA) - 4870 Series.
 - c. Yale Locks and Hardware (YA) - 350 Series.

2.9 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 - a. Fire Exit Removable Mullions: Provide keyed removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions to be used only with exit devices for which they have been tested.
3. Except on fire rated doors and doors receiving access control devices (Loads, REX, DPS), provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is not acceptable except in any case where the door light extends behind the device as in a full glass configuration.
5. Flush End Caps: Provide heavy weight impact resistant flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with four threaded studs for thru-bolts.

- a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
7. Vertical Rod Exit Devices: Provide and install interior surface vertical rod exit devices as Less Bottom Rod (LBR) unless otherwise indicated.
 8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
 12. Hurricane and Tornado Resistance Compliance: Conventional exit devices and tube steel removable mullions to be U.L. listed for windstorm components where applicable. Provide the appropriate hurricane or tornado resistant products that have been independent third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Mounting rails to be formed from smooth stainless steel, brass or bronze architectural materials no less than 0.072" thick, with push rails a minimum of 0.062" thickness. Painted or aluminum metal rails are not acceptable. Exit device latch to be investment cast stainless steel, pullman type, with deadlock feature.
1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Yale Locks and Hardware (YA) - 7000 Series.
- C. Extruded Aluminum Removable Mullions: ANSI/BHMA A156.3 anodized, removable mullions with malleable-iron top and bottom retainers. Mullions to be provided standard with stabilizers and imbedded weatherstrip.
1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) – 808 Series.
 - b. Sargent Manufacturing (SA) - 650A Series.
 - c. Von Duprin (VD) - 5564 Series.
- D. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish. Provide keyed removable feature, stabilizers, and mounting brackets as specified in the Hardware Sets. At openings designed for severe wind load conditions due to hurricanes or tornadoes, provide manufacturers approved mullion and accessories to meet applicable state and local windstorm codes.

1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) - 700/900 Series.
 - b. Sargent Manufacturing (SA) - 980S Series.
 - c. Yale Locks and Hardware (YA) - M200 Series.

2.11 ELECTROMECHANICAL CONVENTIONAL EXIT DEVICES

- A. Electrified Conventional Push Rail Devices (Heavy Duty): Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified below. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.

1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Yale Locks and Hardware (YA) - 7000 Series.

- B. Electrified Options: As indicated in hardware sets, provide electrified exit device options including: electric latch retraction (shall be motorized type that fully retracts the touchpad/push bar), electric dogging, outside door trim control, exit alarm, latchbolt monitoring, lock/unlock status monitoring, touchbar monitoring and request-to-exit signaling. Unless otherwise indicated, provide electrified exit devices standard as fail secure.

2.12 INTEGRATED WIEGAND OUTPUT ACCESS CONTROL EXIT DEVICES

- A. Wiegand Output Integrated Card Reader Exit Hardware: Wiegand output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated proximity card reader, latchbolt and touchbar monitoring, and request-to-exit signaling, in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).
2. Reader supports either HID 125 kHz proximity (up to 39 bits, including Corporate 1000) credentials.
3. 12VDC external power supply required for reader, with optional 24VDC operation available. 24VDC required for solenoid operated exit trim (12VDC if applicable). Fail safe or fail secure options.
4. Installation requires only one cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
5. Acceptable Manufacturers:

- a. Corbin Russwin Hardware (RU) - Access 600 - ED5000 RNE1 Series.
- b. Sargent Manufacturing (SA) - Harmony - H1 80 Series.
- c. Yale Security (YA) - Symphony -7100 SYM Series.

- B. Hurricane and Tornado Resistance Compliance: Integrated Wiegand electronic access control exit devices to be U.L. listed for windstorm components where applicable. Provide the appropriate hurricane or tornado resistant products that have been independent third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.

2.13 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
2. Standards: Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 - a. Where closers are indicated to have mechanical dead-stop, provide heavy duty arms and brackets with an integral positive stop.
 - b. Where closers are indicated to have mechanical hold open, provide heavy duty units with an additional built-in mechanical holder assembly designed to hold open against normal wind and traffic conditions. Holder to be manually selectable to on-off position.
 - c. Where closers are indicated to have a cushion-type stop, provide heavy duty arms and brackets with spring stop mechanism to cushion door when opened to maximum degree.
 - d. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics. Provide drop plates or other accessories as required for proper mounting.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt or security type fasteners as specified in the door Hardware Sets.

- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC8000 Series.
 - b. Sargent Manufacturing (SA) - 351 Series.
 - c. Norton Door Controls (NO) - 7500 Series.

2.14 SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.
1. Acceptable Manufacturers:
 - a. LCN Door Closers (LC) - SEM7800 Series.
 - b. Rixson (RF) - 980/990 Series.
 - c. Sargent Manufacturing (SA) - 1560 Series.

2.15 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Metal Protection Plates: ANSI/BHMA A156.6 certified metal protection plates (kick, armor, or mop), beveled on four edges (B4E), fabricated from the following:
 - a. Stainless Steel: 300 series, .050-inch thick, with countersunk screw holes (CSK).
4. Fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.
5. Metal Door Edging: Door protection edging fabricated from a minimum .050-inch thick metal sheet, formed into an angle or "U" cap shapes, surface or mortised mounted onto

edge of door. Provide appropriate leg overlap to account for protection plates as required. Height to be as specified in the Hardware Sets.

6. Acceptable Manufacturers:
 - a. Ives (IV).
 - b. Rockwood Manufacturing (RO).
 - c. Trimco (TC).

2.16 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Acceptable Manufacturers:
 - a. Ives (IV).
 - b. Rockwood Manufacturing (RO).
 - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
 1. Acceptable Manufacturers:
 - a. Rixson Door Controls (RF).
 - b. Rockwood Manufacturing (RO).
 - c. Sargent Manufacturing (SA).

2.17 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Acceptable Manufacturers:
 1. National Guard Products (NG).
 2. Pemko Manufacturing (PE).
 3. Reese Enterprises, Inc. (RS).

2.18 ELECTRONIC ACCESSORIES

- A. Stand Alone Proximity Card Readers: Stand alone card readers are HID 125 kHz proximity compatible, 12VDC/24VDC hardwired, constructed of weather resistant electronics suitable for either indoor or outdoor applications.
 1. Acceptable Manufacturers:
 - a. AptiQ (AP).
 - b. HID (HI).
 - c. Sargent Manufacturing (SA).
- B. Push-Button Switches: Industrial grade momentary or alternate contact, back-lighted push buttons with stainless-steel switch enclosures. 12/24 VDC bi-color illumination suitable for either flush or surface mounting.
 1. Acceptable Manufacturers:
 - a. Alarm Controls (AC) – TS Series.
 - b. Security Door Controls (SD) - 400 Series.
 - c. Securitron (SU) - PB Series.
- C. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
 1. Acceptable Manufacturers:

- a. Sargent Manufacturing (SA) – 3280 Series.
 - b. Security Door Controls (SD) - DPS Series.
 - c. Securitron (SU) - DPS Series.
- D. Switching Power Supplies: Provide UL listed or recognized filtered and regulated power supplies. Provide single, dual, or multi-voltage units as shown in the hardware sets. Units must be expandable up to eight Class 2 power limited outputs. Units must include the capability to incorporate a battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
- 1. Acceptable Manufacturers:
 - a. Schlage (SC) – 900 Series.
 - b. Securitron (SU) - AQ Series.
 - c. Security Door Controls (SD) – 600 Series

2.19 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.20 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Integrated Wiegand access control products are required to be installed through current members of the ASSA ABLOY "Certified Integrator" (CI) program.
- D. Retrofitting: Install door hardware to comply with manufacturer's published templates and 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 specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 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.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

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

3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. Refer to Section 080671, Door Hardware Schedule, for hardware sets.
- C. Manufacturer's Abbreviations:

- 1. MK - McKinney
- 2. PE - Pemko

3. RO - Rockwood
4. SA - Sargent
5. RF - Rixson
6. SU - Securitron
7. YA - Yale
8. SH - Schlage Electronic Security
9. LM - Liftmaster
10. CR – Crown Industrial

Hardware Schedule

Set: 1.0

Doors: 100.1, 100.3, 100.6,

Each Door to Receive:

6	Hinge (heavy weight)	T4A3386 x NRP 4-1/2" x 4-1/2"	US32D	MK
1	Removable Mullion	12-HCL980	PC	SA
1	Access Control Rim Exit	HC 10 12 21 56-H1-8804 ETJ GMK	US32D	SA
1	Exit Device (exit only)	HC 12 LD 55 8810	US32D	SA
1	Cylinder	10 21 980C1 GMK		SA
2	Closer	TB 351 CPS	EN	SA
2	Kick Plate	K1050 8" x 34"	US32D	RO
1	Threshold	2005AV 72"	US32D	PE
1	Gasketing	303AS 72" 84"	US32D	PE
1	Gasketing	5110BL		PE
2	Door Cable	MCC-DR 6"		MK
2	Frame Cable	MCC-FR 75' 12 COND 20GA		MK
2	Frame Cable	MCC-FR 75' 2 COND DPS		MK
2	Door Position Switch	3287		SA
1	Door Cable	MCC-DR 48"	US32D	
2	Power Transfer	EL-CEPT		SU
1	Power Supply Power	AQL6-E1R8		SU
1	Distribution Board	PDB-8C8R		SU

Notes: Integrated Wiegand card reader exit device on the active leaf. Provide SCCPSS standard Molex 'Plug n Play' connectivity to the EL-CEPT current transfer. Coordinate wiring with the Division 26 Subcontractor. Power supply cannot be located beyond the extents of the 75' 12-conductor cable to avoid a voltage drop. Confirm the static design pressure for the hollow metal as a tested assembly, refer to the structural drawings for the requirements. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the power supply location, excess coiled neatly, tie wrapped together and strapped to the wall next to the power supply.

Both doors are monitored for REX and DPS.

Set: 2.0

Doors: 102.A

Each Door to Receive:

1	Continuous Hinge	CFM83SLF-HD1 SER12		PE
1	Access Control Mort Lock	10 21 H1-82271 24V LNJ GMK	US26D	SA
1	Mortise Deadlock	21 4874 GMK	US26D	SA
1	Closer	TB 351 CPS	EN	SA
1	Drop Plate	351D	EN	SA
1	Kit	581-2	EN	SA
1	Frame Cable	MCC-FR 75' 12 COND 20GA		MK
1	Door Cable	MCC-DR 48"		MK
1	Push Button Switch	660-PB		SH
1	Power Supply	AQL6-E1R8		SU
1	Power Distribution Board	PDB-8C8R		SU

Notes: Integrated Wiegand card reader lockset. Provide SCCPSS standard Molex 'Plug n Play' connectivity to the SER12 current transfer location. Coordinate wiring with the Division 26 Subcontractor. Power supply cannot be located beyond the extents of the 75' 12-conductor cable to avoid a voltage drop. Confirm the static design pressure for the hollow metal as a tested assembly, refer to the structural drawings for the requirements. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the power supply location, excess coiled neatly, tie wrapped together and strapped to the wall next to the power supply. 660-PB push button to be mounted under a desk. Coordinate the location with the Architect. Locate the terminal end of the cable for the push button at the Cisco gateway controlling the card reader for door 1002.2.

Wide stile aluminum door required.

Door is monitored for REX and DPS. Deadbolt is engaged only after hours to secure the office area from access by the corridor or lobby. It is to remain unlocked while the building is occupied.

Set: 3.0

Doors: 102.B, 102.C, 102.D

Each Door to Receive:

2 Hinge	TA2714 4-1/2"	US26D	MK
1 Hinge	TA2714 QC12 4-1/2"	US26D	MK
1 Access Control	10 21 H1-82271 24V	US26D	SA
1 Mort Lock	LNJ GMK		
1 Mortise	21 4874 GMK	US26D	SA
1 Deadlock			
1 Closer	TB 351 CPS	EN	SA
1 Drop Plate	351D	EN	SA
1 Kit	581-2	EN	SA
1 Frame Cable	MCC-FR 75' 12 COND 20GA		MK
1 Door Cable	MCC-DR 48"		MK
1 Push Button	660-PB		SH
1 Switch			
1 Power Supply	AQL6-E1R8		SU
Power			
1 Distribution	PDB-8C8R		SU
Board			

Set: 4.0

Doors: 103.D, 500B, 500D, 503A, 530C

Each Door to Receive:

2 Continuous	CFM-HAR-SLF-HD1 PT		PE
Hinge			
1 Mullion	650A	US28	SA
1 Exit Device	10 21 55 56 AD8504 ETJ GMK	US32D	SA
1 Exit Device	LD 55 AD8510	US32D	SA
2 Closer	TB 351 CPS	EN	SA
2 Drop Plate	351D	EN	SA
2 Kit	581-2	EN	SA
1 Threshold	2005AV 96"		PE
2 Door Cable	MCC-DR 6"		MK

2 Frame Cable	MCC-FR 75' 12 COND 20GA	MK
2 Frame Cable	MCC-FR 75' 2 COND DPS	MK
2 Door Position Switch	3287	SA
1 Door Cable	MCC-DR 48"	MK
2 Power Transfer	EL-CEPT	SU
1 Card Reader	6005BKB00	HI
1 Power Supply	AQD5	SU
Power		
1 Distribution Board	PDB-8C8R	SU

Notes: Balance of weatherseals by the door supplier. Wiegand card reader is door mounted. Provide SCCPSS standard Molex 'Plug n Play' connectivity to the EL-CEPT current transfer. Coordinate wiring with the Division 26 Subcontractor. Power supply cannot be located beyond the extents of the 75' 12-conductor cable to avoid a voltage drop. Confirm the static design pressure for the aluminum storefront as a tested assembly, refer to the structural drawings for the requirements. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the power supply location, excess coiled neatly, tie wrapped together and strapped to the wall next to the power supply. The mini proximity card reader shall be door mounted.

HAR = Height as Required

Both doors are monitored for REX and DPS. Active leaf has electrified latch retraction.

Notes: Integrated Wiegand card reader lockset. Provide SCCPSS standard Molex 'Plug n Play' connectivity to the SER12 current transfer location. Coordinate wiring with the Division 26 Subcontractor. Power supply cannot be located beyond the extents of the 75' 12-conductor cable to avoid a voltage drop. Confirm the static design pressure for the hollow metal as a tested assembly, refer to the structural drawings for the requirements. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the power supply location, excess coiled neatly, tie wrapped together and strapped to the wall next to the power supply. 660-PB push button to be mounted under a desk. Coordinate the location with the Architect. Locate the terminal end of the cable for the push button at the Cisco gateway controlling the card reader for door 1002.2.

Wide stile aluminum door required.

Door is monitored for REX and DPS. Deadbolt is engaged only after hours to secure the office area from access by the corridor or lobby. It is to remain unlocked while the building is occupied.

Set: 5.0

Doors: 103.A, 123

Each Door to Receive:

1 Exit Device	10 21 55 56 AD8504 ETJ GMK	US32D	SA
1 Exit Device	LD 55 AD8510	US32D	SA
2 Door Cable	MCC-DR 6"		MK
2 Frame Cable	MCC-FR 75' 12 COND 20GA		MK
2 Frame Cable	MCC-FR 75' 2 COND DPS		MK
2 Door Position Switch	3287		SA
1 Door Cable	MCC-DR 48"		MK
2 Power Transfer	EL-CEPT		SU
1 Card Reader	6005BKB00		HI
1 Power Supply	AQD5		SU
Power			
1 Distribution Board	PDB-8C8R		SU

Notes: Wiegand card reader is door mounted. Provide SCCPSS standard Molex 'Plug n Play' connectivity to the EL-CEPT current transfer. Coordinate wiring with the Division 26 Subcontractor. Power supply cannot be located beyond the extents of the 75' 12-conductor cable to avoid a voltage drop. Confirm the static design pressure for the aluminum storefront as a tested assembly, refer to the structural drawings for the requirements. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the power supply location, excess coiled neatly, tie wrapped together and strapped to the wall next to the power supply. The mini proximity card reader shall be door mounted.

HAR = Height as Required

Both doors are monitored for REX and DPS. Active leaf has electrified latch retraction.

Set: 6.0

Doors: 103.E, 103.F

Each Door to Receive:

2 Continuous Hinge	CFM83SLF-HD1		PE
1 Mullion	650A	US28	SA
1 Exit Device	LD AD8510	US32D	SA
1 Exit Device	LD 21 AD8504 ETJ	US32D	SA

	GMK		
2 Closer	TB 351 CPS	EN	SA
2 Drop Plate	351D	EN	SA
2 Kit	581-2	EN	SA
1 Threshold	2005AV 96"		PE
2 Frame Cable	MCC-FR 75' 2 COND DPS		MK
2 Door Position Switch	3287		SA

Notes: Confirm the static design pressure for the hollow metal as a tested assembly, refer to the structural drawings for the requirements. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the DPS junction box. This junction box shall be located above the door in an accessible location above the ceiling, excess DPS cable shall be pulled into the junction box coiled neatly, tie wrapped together.

Both doors are monitored for DPS only.

Set: 7.0

Doors: 103.B, 103.C

Each Door to Receive:

1 Exit Device	LD AD8510	US32D	SA
1 Exit Device	LD 21 AD8504 ETJ GMK	US32D	SA
2 Frame Cable	MCC-FR 75' 2 COND DPS		MK
2 Door Position Switch	3287		SA

Notes: Confirm the static design pressure for the hollow metal as a tested assembly, refer to the structural drawings for the requirements. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the DPS junction box. This junction box shall be located above the door in an accessible location above the ceiling, excess DPS cable shall be pulled into the junction box coiled neatly, tie wrapped together.

Both doors are monitored for DPS only.

Set: 8.0

Doors: 300A, 300B

Each Door to Receive:

6 Hinge	TA2714 x NRP 5" x 4-	US26D	MK
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	1/2"			
1 Exit Device	12 NB8710	US32D	SA	
1 Exit Device	12 21 NB8713 ETJ VKC GMK	US32D	SA	
2 Door Closer	TB 351 P10	EN	SA	
2 Kickplate	K1050 8" x 44"	US32D	RO	
2 Electromagnetic Holder	998 24VDC 900 900- 400	689	RF	
2 Astragal	29324CNB 84"		PE	
2 Silencer	608		RO	

Notes: MHO's must be tied into the buildings fire alarm system. Coordinate with the Electrical Subcontractor. Size the kick plates accordingly for these doors as well 2" LDW.

Set: 9.0

Doors: 144-A, 144-B

Each Door to Receive:

1 Threshold	2005AV96		PE	
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Set: 10.0

Doors: 500C

Each Door to Receive:

6 Hinge	TA2714 4-1/2"	US26D	MK	
1 Removable Mullion	L980	PC	SA	
1 Exit Device	21 8813 ETJ VKC GMK	US32D	SA	
1 Exit Device (exit only)	8810	US32D	SA	
1 Cylinder	21 980C1 VKC GMK		SA	
2 Closer	TB 351 CPS	EN	SA	
2 Kick Plate	K1050 8" x 34"	US32D	RO	
1 Gasketing	5110BL		PE	
2 Silencer	608		RO	

Set: 11.0

Doors: 504A, 520A

Each Door to Receive:

3 Hinge (heavy weight)	T4A3386 x NRP 5" x 4-1/2"	US32D	MK	
1 Integrated Card Reader Lock	10 21 H1-82281 24V LNJ GMK	US26D	SA	

1 Door Closer	TB 351 O	EN	SA
1 Kickplate	K1050 8" x 44"	US32D	RO
1 Threshold	114A 44"		PE
1 Hook	66A 44"		PE
1 Gasketing	303AS 36" 84"		PE
1 Frame Cable	MCC-FR 75' 12 COND 20GA		MK
1 Door Cable	MCC-DR 48"		MK
1 Power Transfer	EL-CEPT		SU
1 Power Supply	AQL6-E1R8		SU
Power			
1 Distribution Board	PDB-8C8R		SU

Notes: Provide SCCPSS standard Molex 'Plug n Play' connectivity to the EL-CEPT current transfer. Coordinate wiring with the Division 26 Subcontractor. Power supply cannot be located beyond the extents of the 75' 12-conductor cable to avoid a voltage drop. Termination of all low voltage cables to be provided by the SCCPSS's vendor. All cables scheduled under this set shall be run to the power supply location, excess coiled neatly, tie wrapped together and strapped to the wall next to the power supply.

Door is monitored for REX and DPS.

Set: 12.0

Doors: 506A, 507A, **102.E**

Each Door to Receive:

3 Hinge	TA2714 4-1/2"	US26D	MK
1 Storeroom Lock	21 8204 LNJ GMK	US26D	SA
1 Surface Overhead Stop	10-336	630	RF
3 Silencer	608		RO

Set: 13.0

Doors: 509A

Each Door to Receive:

3 Hinge	TA2714 4-1/2"	US26D	MK
1 Storeroom Lock	21 8204 LNJ GMK	US26D	SA
1 Door Closer	TB 351 O	EN	SA
1 Kick Plate	K1050 8" x 34"	US32D	RO
1 Wall Stop	409	US32D	RO
3 Silencer	608		RO

Set: 14.0

Doors: 515A, 523A

Each Door to Receive:

3 Hinge	TA2714 4-1/2"	US26D	MK
1 Storeroom Lock	21 8204 LNJ GMK	US26D	SA
1 Door Closer	TB 351 O	EN	SA
1 Kick Plate	K1050 8" x 34"	US32D	RO
1 Wall Stop	409	US32D	RO
1 Threshold	2005AV 96"		PE
1 Gasketing	5110BL		PE

Set: 15.0

Doors: 510A

Each Door to Receive:

6 Hinge	TA2714 4-1/2"	US26D	MK
2 Flush Bolt	555	US26D	RO
1 Storeroom Lock	21 8204 LNJ GMK	US26D	SA
2 Surface Overhead Stop	10-336	630	RF
2 Silencer	608		RO

Notes: Template the overhead stops to 90° degree opening.

Set: 16.0

Doors: 511D

Each Door to Receive:

3 Hinge	TA2714 5"	US26D	MK
1 Mortise Deadlock	21 4875 GMK	US26D	SA
1 Pull Plate	BF 107x70C	US32D	RO
1 Push Plate	70C	US32D	RO
1 Door Closer	TB 351 P10	EN	SA
1 Kickplate	K1050 8" x 44"	US32D	RO
1 Door Stop & Holder	494R	US26D	RO
2 Silencer	608		RO

Set: 17.0

Doors: 512A

Each Door to Receive:

3 Hinge	TA2714 5"	US26D	MK
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1 Mortise Deadlock	21 4875 GMK	US26D	SA
1 Pull Plate	BF 107x70C	US32D	RO
1 Push Plate	70C	US32D	RO
1 Door Closer	TB 351 P10	EN	SA
1 Kickplate	K1050 8" x 46"	US32D	RO
1 Door Stop & Holder	494R	US26D	RO
2 Silencer	608		RO

Notes: Template the door closer for 180° swing.

Set: 18.0

Doors: 514A

Each Door to Receive:

3 Hinge	TA2714 4-1/2"	US26D	MK
1 Storeroom Lock	21 8204 LNJ GMK	US26D	SA
1 Closer	TB 351 CPS	EN	SA
1 Kick Plate	K1050 8" x 34"	US32D	RO
1 Wall Stop	409	US32D	RO
3 Silencer	608		RO

Notes: Provide 5" hinges for doors 1302, 1415, size kick plate accordingly.

Set: 19.0

Doors: 517A, 518A, 519A

Each Door to Receive:

3 Hinge	TA2714 4-1/2"	US26D	MK
1 Office Lock	21 8205 LNJ GMK	US26D	SA
1 Surface Overhead Stop	10-336	630	RF
3 Silencer	608		RO

Set: 20.0

Doors: 521A

Each Door to Receive:

3 Hinge	TA2714 4-1/2"	US26D	MK
1 Privacy Set	8215 LNJ	US26D	SA
1 Door Closer	TB 351 O	EN	SA
1 Kick Plate	K1050 8"x 34"	US32D	RO
1 Wall Stop	409	US32D	RO
3 Silencer	608	RO	

Set: 21.0

Doors: 522A

Each Door to Receive:

3	Hinge	TA2714 4-1/2"	US26D	MK
1	Privacy Set	49 8265 LNJ	US26D	SA
1	Door Closer	TB 351 O	EN	SA
1	Kick Plate	K1050 8"x 34"	US32D	RO
1	Wall Stop	409	US32D	RO
3	Silencer	608	RO	

Set: 22.0

Doors: 524A

Each Door to Receive:

3	Hinge	TA2714 5"	US26D	MK
1	Storeroom Lock	21 8204 LNJ GMK	US26D	SA
1	Wall Stop	409	US32D	RO
3	Silencer	608		RO

Set: 23.0

Doors: 500A

Each Door to Receive:

6	Hinge	TA2714 x NRP 5" x 4-1/2"	US26D	MK
1	Exit Device	12 NB8710	US32D	SA
1	Exit Device	12 21 NB8713 ETJ VKC GMK	US32D	SA
2	Door Closer	TB 351 P10	EN	SA
2	Kickplate	K1050 8" x 44"	US32D	RO
2	Electromagnetic Holder	998 24VDC 900 900-400	689	RF
2	Astragal	29324CNB 84"		PE
2	Silencer	608		RO

Notes: MHO's must be tied into the buildings fire alarm system. Coordinate with the Electrical Subcontractor. Size the kick plates accordingly for these doors as well 2" LDW.

Set: 23.0

Doors: SY01, SY02, SY03 (Service Yard Gates)

Each Door to Receive:

4 Hinge	3150P	US26D	LM
1 Cane Bolt	52423P	US26D	CR
1 Slide Bolt	182P11 W/ Staple	US32D	CR

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Glass for doors, interior borrowed lites, storefront framing, glazed window walls.
 - 2. Glazing sealants and accessories.
- B. Related Requirements:
 - 1. Section 08 88 13 "Fire-Resistant Glazing."

1.2 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.

1.3 COORDINATION

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

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For sealants, indicating VOC content.

- C. Glass Samples: For each type of; 12 inches (300 mm) square.
 - 1. Coated glass.
 - 2. Laminated glass.
 - 3. Insulating glass.
- D. 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 manufacturers of insulating-glass units with sputter-coated, low-E coatings glass testing agency and sealant testing agency.
- B. Product Certificates: For glass and glazing products, from manufacturer.
- C. Product Test Reports: For coated glass insulating glass and glazing sealants, for tests performed by a qualified testing agency.
- 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 by coated-glass manufacturer.
- B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

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 (4.4 deg C).

1.10 WARRANTY

- A. Manufacturer's Special Warranty for single unit Products: Manufacturer agrees to replace single units that deteriorate within specified warranty period. Deterioration of single unit glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning single unit glass contrary to manufacturer's written instructions.
 1. Warranty Period: 5 years from date of Material Completion.
- B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 1. Warranty Period: 10 years from date of Substantial Completion.
- D. 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. Basis-of-Design Product: Subject to compliance with requirements, provide AGC Glass Company North America, Inc.; or a comparable product by one of the following:
 1. Viracon, Inc
 2. PPG Industries, Inc.
 3. Schott North America, Inc.

- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
 - 1. Obtain glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. 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: As indicated on Drawings.
 - 2. Design Wind Pressures: As indicated on Drawings.
 - a. Wind Design Data: As indicated on Drawings.
 - b. Basic Wind Speed: As indicated on Drawings.
 - c. Importance Factor: As indicated on Drawings.
 - d. Exposure Category: As indicated on Drawings.
 - 3. Design Snow Loads: As indicated on Drawings.
 - 4. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 - 5. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or **1 inch (25 mm)**, whichever is less.
 - 6. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. 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 (W/sq. m x K)**.
 - 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: "Laminated Glazing Reference Manual" and "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. 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.
 - 1. Minimum Glass Thickness for Exterior Lites: 6 mm.
 - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. 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. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a 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 unless otherwise indicated.

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. Spacer: Manufacturer's standard spacer material and construction.
 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. VOC Content: Sealant shall have a VOC content of 250 g/L or less.
 4. 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 100/50, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation.
 - d. Pecora Corporation.
 - e. Sika Corporation.
 - f. Tremco Incorporated.

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 804.3 tape, where indicated.
 - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

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).

- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 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 (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 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. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. 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.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

- E. 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.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - 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 (3-mm) 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.
- H. 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.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

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 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket 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. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 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.

3.7 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.

3.8 MONOLITHIC GLASS SCHEDULE

A. Glass Type **TFG**: Clear fully tempered float glass.

1. Minimum Thickness: 6 mm or thicker as required for frame system.
2. Safety glazing labeling required.
3. Glass shall comply with testing requirements in 16 CFR 1201 for category II materials.

3.9 LAMINATED GLASS SCHEDULE

A. Glass Type **LG-1**: Clear laminated glass with two plies of fully tempered float glass.

1. Minimum Thickness of Each Glass Ply: 3 mm or thicker as required for frame system.
2. Interlayer Thickness: **0.030 inch (0.76 mm)**.
3. Safety glazing labeling required.

B. Glass Type **LG-2**: Clear laminated glass with two plies of fully tempered float glass.

1. Minimum Thickness of Each Glass Ply: 3 mm.
2. Interlayer Thickness: **0.060 inch (1.52 mm)**.
3. Safety glazing labeling required.

3.10 INSULATING GLASS SCHEDULE

A. Glass Type **IRG-1**: Low-E-coated, clear insulating glass.

Basis-of-Design Product:

1. Subject to compliance with requirements, provide AGC Glass Company North America, Inc.; Energy Select 40 or comparable product by one of the following:
 - a. PPG Industries, Inc.
 - b. Viracon, Inc
 - c. Schott North America, Inc.
2. Overall Unit Thickness: **1 inch**.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass.
5. Interspace Content: Air.
6. Indoor Lite: Heat-strengthened float glass.
7. Low-E Coating: Sputtered on second surface.
8. Winter Nighttime U-Factor: .29 maximum.
9. Summer Daytime U-Factor: .27 maximum.
10. Visible Light Transmittance: 69 percent minimum.

11. Solar Heat Gain Coefficient: .39 maximum.
12. Safety glazing required.

B. Glass Type **IRG-2**: Low-E-coated, clear insulating glass.

1. Subject to compliance with requirements, provide AGC Glass Company North America, Inc.; Energy Select 40 or comparable product by one of the following:
 - a. PPG Industries, Inc.
 - b. Viracon, Inc
 - c. Schott North America, Inc.
2. Overall Unit Thickness: **5/8 inch**.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass.
5. Interspace Content: Air.
6. Indoor Lite: Heat-strengthened float glass.
7. Low-E Coating: Sputtered on second surface.
8. Winter Nighttime U-Factor: .29 maximum.
9. Summer Daytime U-Factor: .27 maximum.
10. Visible Light Transmittance: 69 percent minimum.
11. Solar Heat Gain Coefficient: .39 maximum.
12. Safety glazing required.

3.11 INSULATING-LAMINATED-GLASS SCHEDULE

A. Glass Type **ILG-1**: Low-E-coated, clear insulating laminated glass.

1. Subject to compliance with requirements, provide AGC Glass Company North America, Inc.; Energy Select 40 or comparable product by one of the following:
 - a. PPG Industries, Inc.
 - b. Viracon, Inc
 - c. Schott North America, Inc.
2. Overall Unit Thickness: **1 inch**.
3. Minimum Thickness of Outdoor Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass.
5. Interspace Content: Air.
6. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.
 - a. Minimum Thickness of Each Glass Ply: 3 mm.
 - b. Interlayer Thickness: **0.060 inch (1.52 mm)**.
7. Low-E Coating: Sputtered on second surface.
8. Winter Nighttime U-Factor: .29 maximum.
9. Summer Daytime U-Factor: .27 maximum.
10. Visible Light Transmittance: 69 percent minimum.
11. Solar Heat Gain Coefficient: .39 maximum.
12. Safety glazing labeling required.

B. Glass Type **ILG-2**: Low-E-coated, clear insulating laminated glass.

1. Subject to compliance with requirements, provide AGC Glass Company North America, Inc.; Energy Select 40 or comparable product by one of the following:
 - a. PPG Industries, Inc.
 - b. Viracon, Inc
 - c. Schott North America, Inc.
2. Overall Unit Thickness: **5/8 inch**.
3. Minimum Thickness of Outdoor Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass.

5. Interspace Content: Air.
6. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.
 - a. Minimum Thickness of Each Glass Ply: 3 mm.
 - b. Interlayer Thickness: 0.060 inch (1.52 mm).
7. Low-E Coating: Sputtered on second surface.
8. Winter Nighttime U-Factor: .29 maximum.
9. Summer Daytime U-Factor: .27 maximum.
10. Visible Light Transmittance: 69 percent minimum.
11. Solar Heat Gain Coefficient: .39 maximum.
12. Safety glazing labeling required.

END OF SECTION 08 80 00

SECTION 08 88 13 - FIRE-RESISTANT GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-resistance-rated glazing.

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.

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 glass product; 12 inches (300 mm) square.
- 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 installers and glass testing agency.
- B. Product Certificates: For each type of glass and glazing product, from manufacturer.
- C. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. 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.

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.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during the remainder of the construction period.

1.10 WARRANTY

- A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Material Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Safety Glazing Labeling: Permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear), with visible light transmission not less than 91 percent.
- C. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Laminated Glass: ASTM C 1172. Use materials that have a 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 unless fire-protection or fire-resistance rating is based on another product.
 - 2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.5 FIRE-RESISTANCE-RATED GLAZING

- A. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AGC Glass Company North America
 - b. [SAFTI FIRST Fire Rated Glazing Solutions.](#)
 - c. [Schott North America, Inc.](#)
 - 2. Provide products by same manufacturer as 08 88 10 "FIRE RATED STOREFRONT FRAMING"
 - 3. Provide 120 minute rated glazing at storefront framing, and 90 minute rated glazing at doors.

2.6 GLAZING ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Dow Corning Corporation.](#)
 - b. [GE Construction Sealants; Momentive Performance Materials Inc.](#)
 - c. [Tremco Incorporated.](#)
 2. Manufacturer shall be the same manufacturer provided for 08 88 10 "FIRE RATED STOREFRONT FRAMING"
 3. Colors of Exposed Glazing Sealants: As selected by Design Professional from manufacturer's full range.
- C. 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 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

- B. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- C. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.8 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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.
- 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 fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed work.

3.3 GLAZING, GENERAL

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B. 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.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. 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.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - 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 (3-mm) 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.
- H. 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.
- I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

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 and then to jambs. Cover horizontal framing joints by applying tapes to jambs and 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 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop, so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket 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.
- D. Install gaskets so they protrude past face of glazing stops.

3.6 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. 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 washaway from glass.

3.7 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.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Material Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 08 88 13

SECTION 08 91 19 - FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fixed, extruded-aluminum louvers.

1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).
- C. Vertical Louver: Louver with vertical blades (i.e., the axes of the blades are vertical).
- D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 - 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
 - 2. Show mullion profiles and locations.
- C. Samples: For each type of metal finish required.

- D. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural and seismic performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
- C. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Design earthquake spectral response acceleration, short period (Sds) for Project is as shown on the drawings.
 2. Component Importance Factor: 1.5.
- D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- F. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Drainable-Blade Louver Exterior:
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Airolite Company, LLC \(The\)](#).
 - b. [Nystrom, Inc.](#)
 - c. [Ruskin Company](#).
 2. Louver Depth: 4 inches (100 mm).
 3. Frame and Blade Nominal Thickness: Not less than 0.060 inch (1.52 mm) for blades and 0.080 inch (2.03 mm) for frames.
 4. Mullion Type: Exposed.
 5. Louver Performance Ratings:
 - a. Free Area: Not less than 8.5 sq. ft. (0.79 sq. m) for 48-inch- (1220-mm-) wide by 48-inch- (1220-mm-) high louver.
 - b. Point of Beginning Water Penetration: Not less than 950 fpm (4.8 m/s).
 - c. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 800-fpm (4.1-m/s) free-area intake velocity.
 - d. Air Performance: Not more than 0.15-inch wg (37-Pa) static pressure drop at 1000-fpm (5.1-m/s) free-area exhaust velocity.
 6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
1. Screen Location for Fixed Louvers: Interior face.
 2. Screening Type: Insect screening.

- B. Secure screen frames to louver frames with [**stainless-steel machine screws**] [**machine screws with heads finished to match louver**], spaced a maximum of **6 inches (150 mm)** from each corner and at **12 inches (300 mm)** o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert.
- D. Louver Screening for Aluminum Louvers:
 - 1. Insect Screening: Aluminum, **18-by-16 (1.4-by-1.6-mm)** mesh, **0.012-inch (0.30-mm)** wire.

2.5 BLANK-OFF PANELS

- A. Insulated, Blank-Off Panels: Laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver.
 - 1. Thickness: **1 inch (25 mm)**.
 - 2. Metal Facing Sheets: Aluminum sheet, not less than **0.032-inch (0.81-mm)** nominal thickness.
 - 3. Insulating Core: Rigid, glass-fiber-board insulation or extruded-polystyrene foam.
 - 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than **0.080-inch (2.03-mm)** nominal thickness, with corners mitered and with same finish as panels.
 - 5. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.
 - 6. Panel Finish: Same finish applied to louvers.
 - 7. Attach blank-off panels with clips.

2.6 MATERIALS

- A. Aluminum Extrusions: **ASTM B 221 (ASTM B 221M)**, Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: **ASTM B 209 (ASTM B 209M)**, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.
 - 1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
 - 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
 - 3. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
 - 4. For fastening stainless steel, use 300 series stainless-steel fasteners.
 - 5. For color-finished louvers, use fasteners with heads that match color of louvers.
- D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or **72 inches (1830 mm)** o.c., whichever is less.
 - 1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.
 - 2. Exterior Corners: Prefabricated corner units with mitered and welded blades or blades with concealed close-fitting splices and with fully recessed mullions at corners.
- F. Provide subsills made of same material as louvers or extended sills for recessed louvers.
- G. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.8 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 70 percent PVDF resin by weight in color coat. 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 Design Professional from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, 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. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Design Professional, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 08 91 19

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.

- B. Related Requirements:

- 1. Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

1.3 ACTION SUBMITTALS

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

- 1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
 - 2. Studs and Runners: Provide documentation that framing members' certification is according to SIFA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members."

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For embossed steel studs and runners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Horizontal Deflection: For wall assemblies, limited to:
 - a. Gypsum Wallboard: L/240.
 - b. Ceramic Tile: L/360.
 - c. Plaster: L/360.
- 2. Applied loads:
 - a. Gypsum wallboard: 10 psf.
 - b. Ceramic tile, one side: 15 psf.
 - c. Ceramic tile, two sides: 30 psf.
 - d. Gypsum plaster, one side: 15 psf.
 - e. Gypsum plaster, two sides: 30 psf.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, **G40 (Z120)**, hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners: ASTM C 645.
 - 1. Steel Studs and Runners:
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) Marino\WARE.
 - 2) Clark Dietrich Building Systems, LLC.
 - 3) **CEMCO; California Expanded Metal Products Co.**
 - b. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection 0.0269 inch minimum for gypsum wallboard; 0.0329 inch minimum for tile backing panels, or greater as recommended by tile backer panel manufacturer, or greater as indicated in the manufacturer's published performance data based on the stated performance data..
 - c. Depth: As indicated on Drawings.
 - 2. Embossed Steel Studs and Runners:
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) **CEMCO; California Expanded Metal Products Co.**
 - 2) **ClarkDietrich Building Systems.**
 - 3) **Marino\WARE.**

- b. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements ; 0.0269 inch minimum for gypsum wallboard; 0.0329 inch minimum for tile backing panels, or greater as recommended by tile backer panel manufacturer, or greater as indicated in the manufacturer's published performance data based on the stated performance data.
 - c. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide the following:
 1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to runners while allowing **2-inch (51-mm)** minimum vertical movement.
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) Marino\WARE.
 - 2) [CEMCO; California Expanded Metal Products Co.](#)
 - 3) [ClarkDietrich Building Systems.](#)
 2. Single Long-Leg Runner System: ASTM C 645 top runner with **2-inch- (51-mm-)** deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within **12 inches (305 mm)** of the top of studs to provide lateral bracing.
 3. Double-Runner System: ASTM C 645 top runners, inside runner with **2-inch- (51-mm-)** deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 4. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) Marino\WARE.
 - 2) [CEMCO; California Expanded Metal Products Co.](#)
 - 3) [ClarkDietrich Building Systems.](#)
- D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Marino\WARE.
 - b. [ClarkDietrich Building Systems.](#)
 - c. [Steel Network, Inc. \(The\).](#)
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:

- a. CEMCO; California Expanded Metal Products Co.
 - b. Marino\WARE.
 - c. [ClarkDietrich Building Systems](#).
 2. Minimum Base-Metal Thickness: **0.0329 inch (0.836 mm)**.
- F. Cold-Rolled Channel Bridging: Steel, **0.0538-inch (1.367-mm)** minimum base-metal thickness, with minimum **1/2-inch- (13-mm-)** wide flanges.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. Marino\WARE.
 - c. [ClarkDietrich Building Systems](#).
 2. Depth: As indicated on Drawings.
 3. Clip Angle: Not less than **1-1/2 by 1-1/2 inches (38 by 38 mm)**, **0.068-inch- (1.72-mm-)** thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. Marino\WARE.
 - c. [ClarkDietrich Building Systems](#).
 2. Minimum Base-Metal Thickness: **0.0179 inch (0.455 mm)**.
 3. Depth: As indicated on Drawings.
- H. Cold-Rolled Furring Channels: **0.053-inch (1.34-mm)** uncoated-steel thickness, with minimum **1/2-inch- (13-mm-)** wide flanges.
1. Depth: As indicated on Drawings.
 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of **0.0329 inch (0.8 mm)**.
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.062-inch- (1.59-mm-)** diameter wire, or double strand of **0.048-inch- (1.21-mm-)** diameter wire.
- I. Z-Shaped Furring: With slotted or nonslotted web, face flange of **1-1/4 inches (32 mm)**, wall attachment flange of **7/8 inch (22 mm)**, minimum uncoated-metal thickness of **0.0179 inch (0.455 mm)**, and depth required to fit insulation thickness indicated.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. Marino\WARE.
 - c. [ClarkDietrich Building Systems](#).

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- C. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 1-1/2 inches (38 mm).
- D. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 - 2. Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).
 - b. Depth: As indicated on Drawings.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum **1/2-inch (13-mm)** clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs **6 inches (150 mm)** o.c.
- E. Direct Furring:
1. Screw to wood framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches (610 mm)** o.c.
- F. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced **24 inches (610 mm)** o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches (610 mm)** o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than **12 inches (305 mm)** from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than **1/8 inch (3 mm)** from the plane formed by faces of adjacent framing.
- 3.5 INSTALLING SUSPENSION SYSTEMS
- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Hangers: **48 inches (1219 mm)** o.c.
 2. Carrying Channels (Main Runners): **48 inches (1219 mm)** o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Do not attach hangers to steel roof deck.
 5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within **1/8 inch in 12 feet (3 mm in 3.6 m)** measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 23 00 - GYPSUM PLASTERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Gypsum plastering on expanded-metal lath.
- B. Related Requirements:

1.2 ACTION SUBMITTALS

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

1.3 QUALITY ASSURANCE

- A. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockups for each substrate and finish texture indicated for gypsum plastering, including accessories.
 - 2. Simulate finished lighting conditions for review of mockups.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 FIELD CONDITIONS

- A. Comply with ASTM C 842 requirements or gypsum plaster manufacturer's written recommendations, whichever are more stringent.
- B. Room Temperatures: Maintain temperatures at not less than 55 deg F (13 deg C) or greater than 80 deg F (27 deg C) for at least seven days before application of gypsum plaster, continuously during application, and for seven days after plaster has set or until plaster has dried.

- C. Avoid conditions that result in gypsum plaster drying out too quickly.
 - 1. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
 - 2. Maintain relative humidity levels for prevailing ambient temperature that produce normal drying conditions.
 - 3. Ventilate building spaces in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.

PART 2 - PRODUCTS

2.1 EXPANDED-METAL LATH

- A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, **G60 (Z180)**, hot-dip galvanized-zinc coating.
 - 1. Paper Backing: Kraft paper factory bonded to back of lath.
 - 2. Diamond-Mesh Lath:
 - a. Type: Self-furring.
 - b. Weight: **2.5 lb/sq. yd. (1.4 kg/sq. m)**.

2.2 ACCESSORIES

- A. General: Comply with ASTM C 841, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Plastic Accessories: Manufactured from high-impact PVC.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Alabama Metal Industries Company; a Gibraltar Industries company.](#)
 - b. [Phillips Manufacturing Co.](#)
 - c. [Plastic Components, Inc.](#)
 - d. [Vinyl Corp; a division of ClarkDietrich Building Systems.](#)
 - 2. Cornerbeads: With perforated flanges.
 - a. Smallnose cornerbead; use unless otherwise indicated.
 - 3. Casing Beads: With perforated flanges in depth required to suit plaster bases indicated and flange length required to suit applications indicated.
 - a. Square-edge style; use unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

- B. Bonding Compound: ASTM C 631.
- C. Fasteners for Attaching Metal Lath to Substrates: ASTM C 841.
- D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than **0.0475-inch (1.21-mm)** diameter unless otherwise indicated.
- E. Mix Additives: Use gypsum plaster accelerators and retarders from plaster manufacturer if required by Project conditions. Use only additives that manufacturer recommends in writing for use with plaster to which it is added.

2.4 BASE-COAT PLASTER MATERIALS

- A. Gypsum Neat Plaster: ASTM C 28/C 28M, for use with job-mixed aggregates.
- B. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. [National Gypsum Company](#).
 - 2. [USG Corporation](#).
- C. Aggregates for Base-Coat Plasters: ASTM C 35, sand and perlite.

2.5 FINISH-COAT PLASTER MATERIALS

- A. Gypsum Ready-Mixed Finish Plaster: Manufacturer's standard, mill-mixed, gaged, interior finish.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [National Gypsum Company](#).
 - b. [USG Corporation](#).

2.6 PLASTER MIXES

- A. Mixing: Comply with ASTM C 842 and manufacturer's written instructions for applications indicated.
- B. Mix Additives: Use accelerators and retarders, if required by Project conditions, according to 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.

3.3 INSTALLING EXPANDED-METAL LATH

- A. Expanded-Metal Lath: Install according to ASTM C 841.
 - 1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.
 - 2. Flat-Ceiling and Horizontal Framing: Install flat-diamond-mesh lath.
 - 3. Curved-Ceiling Framing: Install flat-diamond-mesh lath.
 - 4. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.4 INSTALLING ACCESSORIES

- A. General: Install according to ASTM C 841.
- B. Casing Beads: Install at terminations of plasterwork and where indicated, except where plaster passes behind and is concealed by other work and where metal screeds, bases, or frames act as casing beads.

3.5 PLASTER APPLICATION

- A. General: Comply with ASTM C 842.
 - 1. Do not deviate more than plus or minus **1/8 inch in 10 feet (3 mm in 3 m)** from a true plane in finished plaster surfaces when measured by a **10-foot (3-m)** straightedge placed on surface.
 - 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 - 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Base-Coat Plaster:
 - 1. Over Expanded-Metal Lath:
 - a. Scratch Coat: Gypsum neat plaster with job-mixed sand .
 - b. Brown Coat: Lightweight-gypsum ready-mixed plaster.
- C. Finish Coats:
 - 1. Textured Finishes: Match adjacent existing plaster.
 - a. Materials: Gypsum ready-mixed finish plaster.

- b. Locations: Provide textured finish unless otherwise indicated.

3.6 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.

3.7 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 09 23 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Interior gypsum board.
- 2. Tile backing panels.

- B. Related Requirements:

- 1. Section 09 22 16 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
- 2. Section 09 30 13 "Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

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

- B. Samples: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

- 1. Build mockups for the following:

- a. Each level of gypsum board finish indicated for use in exposed locations.
- b. Each texture finish indicated.

- 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
- 3. Simulate finished lighting conditions for review of mockups.
- 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C 1396/C 1396M.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [American Gypsum.](#)
 - b. [Georgia-Pacific Building Products.](#)
 - c. [National Gypsum Company.](#)
 - d. [United States Gypsum Company.](#)

2. Thickness: **5/8 inch**.
 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [American Gypsum](#).
 - b. [Georgia-Pacific Building Products](#).
 - c. [National Gypsum Company](#).
 - d. [United States Gypsum Company](#).
 2. Thickness: **5/8 inch**.
 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- C. Foil-Backed Gypsum Board: ASTM C 1396/C 1396M.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [American Gypsum](#).
 - b. [Georgia-Pacific Building Products](#).
 - c. [National Gypsum Company](#).
 - d. [United States Gypsum Company](#).
 - 2.
 3. Core: **5/8 inch (15.9 mm)**, Type X.
 4. Long Edges: Tapered.
- D. Impact-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. Georgia-Pacific Building Products.
 - c. National Gypsum Company.
 - d. United States Gypsum Company.
 2. Core: **5/8 inch**, Type X.
 3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 4. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
 5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 6. Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements according to test in Annex A1.
 7. Long Edges: Tapered.
- E. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [American Gypsum.](#)
 - b. [Georgia-Pacific Building Products.](#)
 - c. [National Gypsum Company.](#)
 - d. [United States Gypsum Company.](#)
2. Core: **5/8 inch**, Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. [Custom Building Products.](#)
 - c. Georgia-Pacific Building Products.
 - d. [National Gypsum Company.](#)
 - e. [United States Gypsum Company.](#)
 2. Thickness: **1/2 inch**.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet.
 - b. Clark Dietrich.
 - c. Marino Ware.
 - d. American Gypsum.
 - e. [Custom Building Products.](#)
 - f. Georgia-Pacific Building Products.
 - g. [National Gypsum Company.](#)
 - h. [United States Gypsum Company.](#)
 2. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 3. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.

- d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - e. Expansion (control) joint.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Fry Reglet Corporation](#); **"Z" – Reveal; DRMZ-625-100** or a comparable product by one of the following:
 - a. Drywalltrims.
 - b. [Gordon, Inc.](#)
 - c. [Pittcon Industries.](#)
 - d. Aluminum: Alloy and temper with not less than the strength and durability properties of **ASTM B 221 (ASTM B 221M)**, Alloy 6063-T5.
 - e. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
1. Interior Gypsum Board: Paper.
 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
1. Cementitious Backer Units: As recommended by backer unit manufacturer.
 2. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 59, subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from **0.033 to 0.112 inch (0.84 to 2.84 mm)** thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. 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.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."
 - 1. Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."
- G. Vapor Retarder: As specified in Section 07 26 00 "Vapor Retarders."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.

- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch (1.5 mm)** of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft. (0.7 sq. m)** in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch- (6.4- to 9.5-mm-)** wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to 1/2-inch- (6.4- to 12.7-mm-)** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: Vertical surfaces unless otherwise indicated and as indicated on drawings.
 - 2. Type X: Where required for fire-resistance-rated assembly.
 - 3. Foil-Backed Type: As indicated on Drawings and at all laminating conditions.
 - 4. Impact-Resistant Type: As indicated on Drawings.
 - 5. Mold-Resistant Type: As indicated on Drawings.

- B. Single-Layer Application:
1. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 2. On furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 2. On furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- E. Curved Surfaces:
1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
 2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings according to ASTM C 840 and in specific locations approved by Design Professional for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use where indicated.
 - 4. U-Bead: Use at exposed panel edges where indicated.
 - 5. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
 - 3. Level 5: At all other panel surfaces exposed to view except as identified in Level 4.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Glazed wall tile.
3. Waterproofing and Crack Prevention membrane.
4. Metal edge strips.

B. Related Requirements:

1. Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces complying with ASTM C920 (100% Silicone Caulk).
2. Section 09 29 00 "Gypsum Board" for cementitious backer units.
3. Section 09 30 13 "Thick-Set Tiling" for setting materials for inside walk-in cooler/freezers.

1.2 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Full-size units of each type of trim and accessory for each color and finish required.
 - 3. Metal edge strips in 6-inch (150-mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of product.
- C. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer is a member of the National Tile Contractors Association.
 - 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
 - 2. Obtain crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
 - 1. Waterproofing and Crack Prevention membrane.
 - 2. Metal edge strips.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS

- A. Tile Type CFT-1: porcelain tile.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Crossville Ceramics Color Blox Porcelain Stone® or a comparable product by one of the following:
 - a. Marca Carona Tile.
 - b. Artasin Modern Touch.
 - 2. Composition: Porcelain.
 - 3. Face Size: 18 by 18 inches.
 - 4. Thickness: 3/8 inch.

5. Face: Plain with square edges.
 6. Two colors in checkerboard pattern.
 7. Grout Color: As selected by Design Professional from manufacturer's full range.
 8. Base: See Wall Tile CWT below.
- B. Tile Type CFT-2: Porcelain Tile for Kitchen floor.
1. Basis of Design Product: Subject to compliance with requirements, provide Crossville Ceramics; Cross-Colors Mingles, Cross Tread 8 by 8-inch Porcelain or comparable product by one of the following:
 - a. Ann Sacks Tile.
 - b. Walker-Zanger.
 2. Composition: Porcelain.
 3. Face Size: 8 by 8 inch
 4. Thickness: 5/16 inch
 5. Face: Raised cross-tread pattern (CTS).
 6. Installation: Thick-set, 'mud' bed – see 09 30 13 Thick-Set Tiling inside Cooler/Freezer; Thin-set in all other locations where this tile is indicated.
 7. Grout Color: Epoxy in color as selected by Design Professional from manufacturer's full range.
 8. **CCB-3** Base Installations: Coved with rounded top, module size 6 by 8 inches, Basis of Design: Crossville Cross-Colors. Provide where no tile is installed above base.
- C. Tile Type CFT-3: Porcelain Tile for Kitchen OFFICE floor.
1. Basis of Design Product: Subject to compliance with requirements, provide Crossville Ceramics; Cross-Colors Mingles, Honed 8 by 8-inch Porcelain or comparable product by one of the following:
 - a. Ann Sacks Tile.
 - b. Walker-Zanger.
 2. Composition: Porcelain.
 3. Face Size: 8 by 8 inch
 4. Thickness: 5/16 inch
 5. Face: Smooth, no pattern.
 6. Installation: Thin-set.
 7. Grout Color: Epoxy in color as selected by Design Professional from manufacturer's full range.
 8. **CCB-3** Base Installations: Coved with rounded top, module size 6 by 8 inches, Basis of Design: Crossville Cross-Colors. Provide where no tile is installed above base.
- D. Tile Type CWT-1: Glazed wall tile.
1. Basis-of-Design Product: Subject to compliance with requirements, provide United States Ceramic Tile Color Collection wall tile ROCA; Gloss/Matte Wall Tile or a comparable product by one of the following:
 - a. Interceramic Tile.
 - b. American Olean Tile.
 2. Module Size: 3 by 6 inches.
 3. Thickness: 5/16 inch (8 mm).
 4. Face: Pattern of design indicated, with manufacturer's standard edges.
 5. Finish: Color to be selected by Design Professional from manufacturer's full range.
 6. Grout Color: As selected by Design Professional from manufacturer's full range.
 7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

- a. Base for Thinset Mortar Installations: CCB-1 (Style # AT3610 - Universal), Straight, module size 6 by 6 inches. Provide where tile is installed above base. CCB-2 (Style # AT3610 – Round Top), module size 6 inches high by 6 inches wide. Provide where no tile is installed above base.
- b. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 2 by 6 inches.
- c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
- d. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.
- e. Internal Corners: Field-buttet square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

2.4 WATERPROOFING AND CRACK PREVENTION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik, Inc; Durabond D-222 Duraguard Membrane.
 - b. C-Cure; Pro-Red Waterproofing and Crack Prevention Membrane.
 - c. Custom Building Products; Basis of Design: RedGard Waterproofing and Crack Prevention Membrane.
 - d. Laticrete.
 - e. MAPEI Corporation.

2.5 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products. Basis of Design: "ProLite Thin Set Mortar".
 - c. Laticrete.
 - d. MAPEI Corporation.
 2. Provide 10 year full system Warranty; 25-year Warranty if over a membrane.

2.6 GROUT MATERIALS

- A. Polymer-Modified Cement Grout: CFT-1 = ANSI 188.15; CFT-2 = ANSI A118.3; CWT ANSI 118.7.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.

- b. Custom Building Products, Basis of Design: Fusion Pro Single Component Grout;
Walls: Prismic SureColor Grout.
 - c. Laticrete.
 - d. MAPEI Corporation.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3. For Use with CFT-2.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products. **Basis of Design:** CEG Lite Commercial Epoxy Grout.
 - c. MAPEI Corporation.
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to **140 and 212 deg F (60 and 100 deg C)**, respectively, and certified by manufacturer for intended use.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bonsal American, an Oldcastle company.
 - b. Custom Building Products.
 - c. Jamo Inc.
 - d. Laticrete.
 - e. MAPEI Corporation
 - f. TEC; H.B. Fuller Construction Products Inc.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Design Professional.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from

other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Glazed Wall Tile: 1/16 inch.
 - 2. Porcelain Floor Tile: 3/16 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - J. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
 - K. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- 3.4 WATERPROOFING AND CRACK PREVENTION MEMBRANE INSTALLATION – FULL COVERAGE
- A. Install waterproofing and crack prevention membrane below all floor tiles to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
 - B. Install waterproofing and crack prevention membrane behind wall tiles on 'wet' walls (walls with plumbing fixtures) to top of base on cementitious backer board, masonry or concrete.
 - C. Allow waterproofing and crack prevention membrane to cure before installing tile or setting materials over it.
- 3.5 ADJUSTING AND CLEANING
- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
 - B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- 3.6 PROTECTION
- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
 - B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
 - C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F122-Full; thinset mortar on full-coverage waterproofing membrane, following EJ171 for applicable movement joints.
 - a. Ceramic Tile Type: CFT-1.
 - b. Waterproofing Membrane: ANSI A118.10; full coverage.
 - c. Thinset Mortar: ANSI A118.15.
 - d. Grout: Single Component Grout.
 - e. Joint Sealant: ASTM C920 in matching color to selected grout.
2. Ceramic Tile Installation: TCNA F122; thinset mortar over full-coverage waterproofing membrane; epoxy grout, following EJ171 for applicable movement joints (perimeters):
 - a. Ceramic Tile Type: CFT-2 and CFT-3.
 - b. Waterproofing Membrane: ANSI A118.10; full coverage.
 - c. Thinset Mortar: ANSI A118.15.
 - d. Grout: ANSI A118.3 Epoxy grout.
 - e. Joint Sealant: ASTM C920 in matching color to selected grout.

B. Interior Wall Installations, Masonry or Concrete:

1. Ceramic Tile Installation: TCNA W202I; thinset mortar following EJ171 for applicable movement joints.
 - a. Ceramic Tile Type: CWT-1.
 - b. Thinset Mortar: ANSI A118.15.
 - c. Grout: Latex Modified Cement Grout – ANSI A118.7.
 - d. Joint Sealant: ASTM C920 in matching color to selected grout.

C. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W244C; thinset mortar on cementitious backer units following EJ171 for applicable movement joints.
 - a. Ceramic Tile Type: CWT-1.
 - b. Cementitious Backer Unit – ANSI A118.9.
 - c. Thinset Mortar: ANSI A118.15.
 - d. Grout: Latex Modified Cement Grout – ANSI A118.7.
 - e. Joint Sealant: ASTM C920 in matching color to selected grout.

END OF SECTION 09 30 00

SECTION 09 30 13 – THICK-SET TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Epoxy Grout.
 - 2. Waterproofing membrane topically applied.
 - 3. Joint sealant.
 - 4. Tile: CFT-2 specified in 09 30 00 Tiling.
- B. Location: Inside walk-in Cooler/Freezer only.

1.2 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108/A118 Series.
- C. TCNA (Tile Council of North America) Handbook for Ceramic Glass & Stone Tile Installation.
- D. Module Size: Actual tile size plus joint width indicated.
- E. Face Size: Actual tile size, excluding spacer lugs.
- F. Installation Product Manufacturers Printed Installation Instructions.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile.
 - 2. Full-size units of each type of trim and accessory.
- D. Qualification Data: For Installer: Minimum 5 years experience and 5 similar projects.

- E. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- F. Product Certificates: For each type of product.
- G. Product Test Reports: For tile-setting and -grouting products.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.6 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of each type of floor tile installation.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store dry ingredients on elevated platforms.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
- B. Maintain ambient and surface temperatures between 50 and 90 degrees F during and for 14 days after the installation is complete before activating the freezer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations of Installation Materials: Obtain all installation materials from a single source manufacturer to assure compatibility and be in compliance with manufacturers Full System Warranty.
 - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer. Basis of Design products is Custom Building Products unless otherwise noted.
 - 2. Products for a factory blended mortar bed mix, an option of site mixing bulk sand and cement for the mortar bed mix, either way, must be ANSI A108.1 compliant.

2.2 PRODUCTS, GENERAL

- A. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.3 TILE PRODUCTS

- A. Ceramic Tile Type **CFT-#2**: See Section 09 30 00.

2.4 WATERPROOFING AND CRACK PREVENTION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik, Inc; Durabond D-222 Duraguard Membrane.
 - b. C-Cure; Pro-Red Waterproofing and Crack Prevention Membrane.
 - c. Custom Building Products; **Basis of Design**: RedGard Waterproofing and Crack Prevention Membrane.
 - d. MAPEI Corporation.

2.5 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Medium Bed): ANSI A118.4. Latex Portland Cement Mortar.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. C-Cure.
 - c. Custom Building Products. EBM-Lite Premium Epoxy Bonding Mortar.
 - d. Laticrete.
 - e. MAPEI Corporation.
 - 2. Provide 10 year full system Warranty; 25-year Warranty if over a membrane.

2.6 GROUT MATERIALS

- A. Water-Cleanable Epoxy Grout: ANSI A118.3.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. Custom Building Products; Ceglite I6 Industrial Grade Commercial Epoxy Grout. Basis of Design. CEG IG
 - c. Jamo Inc.
 - d. MAPEI Corporation.
 - e. Southern Grouts & Mortars, Inc.

2.7 MISCELLANEOUS MATERIALS

- A. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C. Joint Sealant: 100% silicone caulk. ASTM C920 rated sealant. 100% Silicone Caulk by Custom Building Products in color to match grout. Basis of Design.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify freezer floor is clean, dry and smooth.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Where indicated, prepare substrates to receive topical waterproofing by applying a reinforced mortar bed over a cleavage membrane that complies with ANSI A108.1B

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- F. Form perimeter movement joints in accordance with EJ171I. Delete reference to EJ171C since there will be no in-field movement joints.
- G. Insert Backer Rod into mortar bed joints prior to the application of topical liquid waterproofing.
- H. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Porcelain Tile: 3/8 inch (9.5 mm).

3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate. Flash waterproofing up perimeter walls a distance of high the base tile to be hidden/covered by thin set applied base tile.
- B. Allow waterproofing to cure before setting tile.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all porcelain tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning.

3.6 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- 1. Ceramic Tile Installation: TCNA F114 and ANSI A108.1B with topical waterproofing membrane, following EJ171I for perimeter movement joints.
 - a. Ceramic Tile Type: Porcelain Tile.
 - b. Bond Coat for Cured-Bed Method: Medium-bed, latex-portland cement mortar.
 - c. Grout: Epoxy grout. ANSI A108.6
 - d. Waterproofing: ANSI A108.13 on top of cured mortar bed, flash up perimeter walls to height of porcelain base to form a watertight area.
- 2. Base Tile Installation: TCNA TR71 I (Tile Over Other Surfacing Materials/Walls and Floors). Thin set base tile to RedGard coated metal walls. Provide movement joints at all corners.
 - a. Backbutter Base Tile for 100% coverage with no voids.
 - b. Provide perimeter soft joint where base tile meets floor tile in accordance with TCNA EJ171 I and TCNA "Flush".

END OF SECTION 09 30 13

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS AND CLOUDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For each exposed product and for each color and texture specified, **6 inches (150 mm)** in size, length and width as appropriate.
- C. Samples for Verification: For each component and for each exposed finish prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of **6-inch- (150-mm-)** square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of **6-inch- (150-mm-)** long Samples of each type, finish, and color.
 - 3. Clips: Seismic clips.
- D. Include design calculations for seismic restraints for Seismic zone C, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Size and location of initial access modules for acoustical panels.
 - 4. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.

- d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
5. Minimum Drawing Scale: **1/8 inch = 1 foot (1:96)**.

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

1.5 CLOSEOUT SUBMITTALS

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

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 - 3. Seismic Clips: Equal to 1 percent of quantity installed.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
- B. Indicate portion of ceiling represented by mockup on Drawings or draw mockup as separate element.
- C. Build mockup of typical ceiling area as shown on Drawings.
- D. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Design Professional specifically approves such deviations in writing.
- E. Retain subparagraph below if the intention is to make an exception to the default requirement in Section 01 40 00 "Quality Requirements" for demolishing and removing mockups.
- F. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.8 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 stabilized moisture content.

1.9 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.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 for Seismic Zone C.
- B. 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: 450 or less.
- C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 ACOUSTICAL PANELS (**APC-1**)

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Armstrong World Industries, Inc](#); **DUNE™ 1772 with Square Edge** or a comparable product by one of the following:
 - 1. CertainTeed Corporation; PERFORMA™ Sand Micro™ with Square Edge.
 - 2. United States Gypsum Company; Olympia Micro™ with Square Edge.

- 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 fire-resistance-rated panels as follows:
 - 1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
 - 2. Pattern: CE (perforated, small holes and lightly textured).
 - 3. Fire Class: A.
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.83.
- F. Ceiling Attenuation Class (CAC): Not less than 30.
- G. Noise Reduction Coefficient (NRC): Not less than 0.50.
- H. Edge/Joint Detail: Square.
- I. Thickness: 5/8 inch (15 mm).
- J. Modular Size: 24 by 24 inches (610 by 610 mm).
- K. HumiGuard® Plus, BioBlock®, High Recycled Content, 30-year Warranty.

2.4 ACOUSTICAL PANELS (**APC-2**)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc.; **FINE FISSURED™ 1713** or a comparable product by one of the following:
 - 1. CertainTeed Corporation; School Board® FFSB-#8221 157.
 - 2. United States Gypsum Company; Astro®.
- 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 fire-resistance-rated panels as follows:
 - 1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
 - 2. Pattern: CE (perforated, small holes and lightly textured).
 - 3. Fire Class: A.
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.85.
- F. Ceiling Attenuation Class (CAC): Not less than 35.
- G. Noise Reduction Coefficient (NRC): Not less than 0.70.

- H. Edge/Joint Detail: Square.
- I. Thickness: 3/4 inch.
- J. Modular Size: 24 by 24 inches (610 by 610 mm).
- K. HumiGuard® Plus, BioBlock®, High Recycled Content, 30-year Warranty.

2.5 ACOUSTICAL PANELS (**APC-3**) Acoustical Cloud

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Armstrong World Industries, Inc](#); **WOODWORKS® CHanneled TEGULAR IMAGES WITH WOODWORKS AXIOM TRIM AT EDGES AS A 'CLOUD'** or a comparable product by one of the following:

- 1. CertainTeed Corporation.
- 2. United States Gypsum Company.

- 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.

- A. Classification: Provide panels as follows:

- 1. Type and Form: Type XX, WoodWorks Tegular, Perforated particle board with IMAGES™ Finish and black acoustical fleece.
- 2. Perforations: W7.
- 3. Fire Class: A.

- B. Color: Images Light Cherry, PLC, with W7 Perforations.

- C. Provide 6657 BioAcoustic Infill Panels in Black Matte.

- D. Ceiling Attenuation Class (CAC): NA.

- E. Noise Reduction Coefficient (NRC): Not less than 0.75.

- F. Edge/Joint Detail: Tegular.

- G. Thickness: 11/16-inch.

- H. Modular Size: 24 by 24 inches (610 by 610 mm).

- I. Light Fixtures: Integrated into 'cloud' as shown on the Cafeteria Drawings.

- J. Provide Axiom trim, black, at exposed edges, 6"h, to match Woodworks Channeled Images.

2.6 ACOUSTICAL PANELS (**APC-4**)

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide Armstrong World Industries, Inc; **Kitchen Zone™ 673** or a comparable product by one of the following:

1. CertainTeed Corporation.
 2. United States Gypsum Company.
- 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 fire-resistance-rated panels as follows:
1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with factory-applied latex paint.
 2. Pattern: G (lightly textured).
 3. Fire Class A.
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.80.
- F. Ceiling Attenuation Class (CAC): Not less than 33.
- G. Edge/Joint Detail: Square.
- H. Thickness: **5/8 inch (15 mm)**.
- I. Modular Size: **24 by 24 inches (610 by 610 mm)**.
- J. HumiGuard® Plus, BioBlock®, 30-year Warranty.

2.7 STAINLESS STEEL PANEL CEILING: **(APC-5)**

- A. Stainless Steel Panel Ceiling: Stainless steel panels (304), 22 gauge, 24 inches x 24 inches, fabricated.

2.8 ELEVATOR CAB PANEL CEILING: **(APC-6)**

- A. Eggcrate Open Grid Ceiling: 'Eggcrate' open acrylic panels, size to match existing.

2.9 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Prelude 15/16 by Armstrong World Industries, Inc for APC-1, APC-2, APC-4 or a comparable product by one of the following:
1. CertainTeed Corporation.
 2. United States Gypsum Company.
- 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, 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 (Z90)** coating designation; with prefinished **15/16-inch- (24-mm-)** wide metal caps on flanges.
1. Structural Classification: Intermediate-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: Cold-rolled steel.
 5. Cap Finish: Painted white.
 6. Seismic Category C.
- D. In existing acoustical ceiling areas that are a 2 x 4 grid, provide XL7328 cross-tee to convert to a 2 x 2 grid.
- E. Wide-Face, Capped, Double-Web, Stainless-Steel Suspension System: Main and cross runners roll formed from Type 304 or 316 stainless-steel sheet, with prefinished **15/16-inch- (24-mm-)** wide, stainless-steel caps on flanges. **Supply in area(s) receiving APC-5.**
1. Structural Classification: Intermediate-duty system.
 2. Face Design: Flat, flush.
- F. **Basis-of-Design Product for APC-3 (Wood Cloud):** Subject to compliance with requirements, provide Suprefine® XL Fire Guard 9/16 by Armstrong World Industries, Inc.; or a comparable product by one of the following:
1. CertainTeed Corporation.
 2. United States Gypsum Company.
- G. 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.
- H. Narrow-Face, Capped, Double-Web, Fire-Rated Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 9/16-inch- wide metal caps on flanges.
1. Structural Classification: Intermediate-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: Cold-rolled steel.
 5. Cap Finish: Painted Black.
 6. Seismic Category C.
- 2.10 HANGING ACOUSTICAL BAFFLES (CLOUDS) (**HAB**)
- A. Sound-Diffusing Wall Panel: Manufacturer's standard baffle construction consisting of virgin PET.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide AUTEX Interior Acoustics Ceiling Baffles, ~~Lattice~~ **Frontier Tundra**, contact Architectural Finishes, Inc. Bill Cherry 800-676-0843, or a comparable product by one of the following:
 - a. Armstrong World Industries, Turf.
 - b. MDC Interior Solutions, Zentra, individual baffles.

- c. Unika Vaev.
- d. CSI Soundcore Strata Ceiling suspended baffles
2. NRC Rating: 0.45-0.9 NRC depending on installation
3. Colors: Two Colors as selected by the Design Professional.
4. Fire Rating: ASTM E84, Class-A Fire Rated.
5. Shape: Baffles: rectangles of several lengths, one height.
6. Mounting: Individually hung baffles that are suspended to the underside of the deck, ~~integrating light fixtures~~ **coordinate with light fixtures hung between baffles**, mounted with manufacturer's standard mounting components.
7. Panel Width: As indicated on Drawings.
8. Panel Length: As indicated on Drawings.
9. Location: Cafeteria.

2.11 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.
 - c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316.
 - d. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.
 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- (3.5-mm-)** diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

- E. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- F. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- G. METAL EDGE MOLDINGS
- H. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc; or a comparable product by one of the following:
 - 1. CertainTeed Corporation.
 - 2. United States Gypsum Company.
- I. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
- J. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of **1.5 mils (0.04 mm)**. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.12 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."

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, and manufacturer's written instructions.
1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- 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. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. 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.
 4. 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.
 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 7. Do not attach hangers to steel deck tabs.
 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 9. Space hangers not more than **48 inches (1200 mm)** o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than **8 inches (200 mm)** from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- 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 (400 mm)** o.c. and not more than **3 inches (75 mm)** 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. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.

2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
3. Install seismic clips; space according to panel manufacturer's written instructions unless otherwise indicated.
4. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of **1/8 inch in 12 feet (3 mm in 3.6 m)**, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of **1/8 inch in 12 feet (3 mm in 3.6 m)**, non-cumulative.

3.5 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 09 51 13

SECTION 09 64 00 - WOOD STAGE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Patching (as necessary) existing solid wood flooring, stage apron, existing base, stairs to stage from Auditorium floor.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor assembly and accessory. Include plans, sections, and attachment details. Include expansion provisions and trim details.
- C. Samples: For each exposed product and for each color and texture specified, approximately **12 inches (300 mm)** long and of same thickness and material indicated for the Work and showing texture variations expected to match existing wood.
- D. Samples for Verification: For each type of wood flooring and accessory, with paint color and finish required, approximately **12 inches (300 mm)** long and of same thickness and material indicated for the Work and showing the full range of normal color and texture variations expected.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wood flooring and base materials in unopened cartons or bundles.
- B. Protect wood flooring and base from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.
- C. Store wood flooring and base materials in a dry, warm, ventilated, weathertight location.

1.4 FIELD CONDITIONS

- A. Conditioning period begins not less than seven days before wood flooring and base installation, is continuous through installation, and continues not less than seven days after wood flooring installation.
 - 1. Environmental Conditioning: Maintain ambient temperature between **65 and 75 deg F (18 and 24 deg C)** and relative humidity planned for building occupants in spaces to receive wood flooring during the conditioning period.
 - 2. Wood Flooring Conditioning: Move wood flooring into spaces where it will be installed, no later than the beginning of the conditioning period.

- a. Do not install flooring until it adjusts to relative humidity of, and is at same temperature as, space where it is to be installed.
 - b. Open sealed packages to allow wood flooring to acclimatize immediately on moving flooring into spaces in which it will be installed.
- B. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Hardwood Flooring: Comply with NWFA A500 for species, grade, and cut.

2.2 FIELD-FINISHED WOOD FLOORING, STAGE APRON AND WOOD BASE

- A. Solid-Wood Flooring for Patching: Kiln dried to 6 to 9 percent maximum moisture content; tongue and groove and end matched; with backs channeled.
1. Grade and Species: No. 1 Common red oak.
 2. Cut: Plain sawn.
 3. Flooring Thickness: Match existing.
 4. Face Width: Match existing.
 5. Lengths: Random-length strips complying with applicable grading rules.
 6. Stain: Match Design Professional's sample.
- B. Stage Floor Paint: Low-gloss, matte black finish. NOTE: Final selection of product to be approved by Owner.
- a. Rose Brand Rosco Tough Prime™ (black). RoseBrand.com
 - b. Rose Brand Rosco Colorcoat™ (black). RoseBrand.com
 - c. Sculptural Arts' Artist's Choice Saturated Paint #7720 Masking Black, with Sculptural Arts' Plastic Varnish Flat #7601 clear protective coating. [Artist's Choice Direction Sheet \(sculpturalarts.com\)](http://Artist's Choice Direction Sheet (sculpturalarts.com))
 - d. Vanex Breakthrough (PPG) - - Satin Wrought Iron Black. [BREAK-THROUGH! 50 Interior/Exterior WB Acrylic - Professional Quality Paint Products - PPG \(ppgpaints.com\)](http://BREAK-THROUGH! 50 Interior/Exterior WB Acrylic - Professional Quality Paint Products - PPG (ppgpaints.com))
 - e. Madison Chemical Company GemThane STC (Stage Top Coat) over a base coat of their recommended primer.
- C. Tread of steps to the stage floor: Polyurethane Finish System: For tread of steps to stage floor only, complete water-based system of compatible components that is recommended by finish manufacturer for application indicated.
1. Manufacturers: Provide Basis of Design Product Bona Traffic Anti-Slip:
 - a. Basis of Design: Bona USA Inc. Bona Traffic Anti-Slip®. Meets ASTM 2047 – ADA recommendation for accessible routes; non-yellowing, Matte Sheen.
 - b. Subject to compliance with requirements, products by one of the following may be approved:
 - 1) Sherwin-Williams.
 - 2) PPG.

- 3) Benjamin Moore.
 2. Paint: See 09 91 23 Interior Painting for paint type.
 - a. Color: As directed by the Design Professional.
 3. Finish Coats: Formulated for multicoat application on wood flooring; two coats on the treads over paint.
- D. Stage Apron and Wood Base: Preparation of wood substrate to be as directed in Section 09 91 23 and in color(s) as directed by the Design Professional.

2.3 ACCESSORY MATERIALS

- A. Wood Sleepers and Subfloor: As specified in Section 06 10 00 "Rough Carpentry" and Section 06 16 00 "Sheathing."
- B. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by wood flooring manufacturer.
- C. Fasteners: As recommended by manufacturer, but not less than that recommended in NWFA's "Installation Guidelines."
- D. Thresholds and Saddles: To match wood flooring. Tapered on each side.
- E. Reducer Strips: To match wood flooring. 2 inches (51 mm) wide, tapered, and in thickness required to match height of flooring.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of wood flooring.
- B. Proceed with patching and re-finishing only after unsatisfactory conditions have been corrected.

3.2 FIELD RE-FINISHING

- A. Machine-sand flooring to remove offsets, ridges, cups, and sanding-machine marks that are noticeable after finishing. Vacuum and tack with a clean cloth immediately before applying finish.
 1. Comply with applicable recommendations in NWFA's "Installation Guidelines."
- B. Fill open-grained hardwood.
- C. Fill and repair wood flooring defects.
- D. Apply floor-finish materials in number of coats recommended by finish manufacturer for application indicated, but not less than one coat of floor sealer and three finish coats.

1. Apply stains to achieve an even color distribution matching approved Samples.
 2. For water-based finishes, use finishing methods recommended by finish manufacturer to minimize grain raise.
- E. Cover wood flooring before finishing.
- F. Do not cover wood flooring after finishing until finish reaches full cure, and not before seven days after applying last finish coat.

3.3 PROTECTION

- A. Protect installed wood flooring during remainder of construction period with covering of heavy kraft paper or other suitable material. Do not use plastic sheet or film that might cause condensation.
1. Do not move heavy and sharp objects directly over kraft-paper-covered wood flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION 09 64 00

SECTION 09 65 00 - RESILIENT TILE FLOORING, WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. LVT.
 - 2. Roll vinyl flooring (dance).
 - 3. Resilient base.
 - 4. Stair tread/risers.
 - 5. Resilient accessories, nosing for stairs, and transitions.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification:
 - 1. Floor Tile:
 - a. Units of each color and pattern of product required of size indicated below:
 - 1) Floor Tile: 6-by-9-inch (150-by-230-mm) units.
 - 2. Resilient base and accessories:
 - a. For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for static-control resilient flooring.
- C. Slab Moisture Test Results.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

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. Furnish not less than for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).
 - 1. Store floor tiles on flat surfaces.
- B. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Material Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during floor tile installation.

- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile and resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 LUXLURY VINYL FLOOR TILE (LVT)

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide Mannington Spacia, Stone or a comparable product by:
 - 1. Karndean.
 - 2. Shaw Hard Surface Flooring.
- B. Tile Standard: ASTM F 1700.
 - 1. Class: Class III, printed film vinyl tile.
 - 2. Type: B, embossed surface.
- C. Wear Layer Thickness: 20 mil, 0.020 inch (0.5 mm).
- D. Overall Thickness: 3 mm or nominal 1/8".
- E. Size: 18 x 18 inches (450 mm x 450 mm). 12 x 24 inches is also acceptable.
- F. Edge Detail: Micro Bevel.
- G. Installation Method: Ashlar.
- H. Installation Material: As recommended in writing by the Manufacturer.
- I. Colors and Patterns: Match Design Professional's sample.

2.3 ROLL VINYL FLOOR (DANCE) (RDF)

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide American Harlequin Floors, STANDFAST, or a comparable product by:
 - 1. Rosco, Adagio.
 - 2. WWW.Greatmats.com.
 - 3. Rose Brand
- B. Standard: ASTM E648, E662 Class 1.

- C. Overall Thickness: .100 inches (2.6 mm).
- D. Color: Black.
- E. Size: Roll width: 59-inches; roll length: 56'-7".
- F. Cushion: Provide cushion under Roll Vinyl Floor (Dance) to match existing.
- G. Installation Material: As recommended in writing by the Manufacturer.

2.4 VINYL BASE (**VB**)

- A. Provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Johnsonite (Tarkett).
 - 3. Mannington.
 - 4. Roppe.
- B. Product Standard: ASTM F 1861, Type TV (vinyl, thermoplastic).
 - 1. Group: I (solid, homogeneous).
 - 2. Style: Style B, Cove.
- C. Minimum Thickness: 0.125 inch (3.2 mm).
- D. Height: 4 inches (102 mm).
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Install on face of base of casework – do not install on sides of casework unless directed by the Design Professional.
- I. Colors and Patterns: As selected by the Design Professional from full range of industry colors, allow for two colors.

2.5 RUBBER STAIR ACCESSORIES (**STR**)

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Johnsonite (Tarkett). Basis of Design: Pattern 'Cubis'.
 - 3. Mannington.

4. Roppe.
- C. Stair Treads: ASTM F 2169.
1. Type: TS (rubber, vulcanized thermoset) or TP (rubber, thermoplastic).
 2. Class: 2 (pattern; embossed, grooved, or ribbed).
 3. Group: 1 (embedded abrasive strips) 2 (with contrasting color for the visually impaired).
 4. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
 5. Nosing Height: 1-1/2 inches (38 mm).
 6. Thickness: 1/4 inch (6 mm) and tapered to back edge.
 7. Size: Lengths and depths to fit each stair tread in one piece.
- D. Locations: Provide rubber stair accessories in areas indicated on tread/risers with upper and lower landings to receive LVT.
- E. Colors: As selected by Architect from full range of industry colors.

2.6 RESILIENT MOLDING ACCESSORY

- A. Provide products by one of the following:
1. Armstrong World Industries, Inc.
 2. Johnsonite (Tarkett).
 3. Mannington.
 4. Roppe.
- B. Description:
1. Vinyl joiner for resilient tile and carpet for transitions between these flooring materials, and other locations where a transition is required.
 2. Nosing for stair treads where indicated to receive nosing only: at stairs to exterior.
 3. Colors and Patterns: As selected by the Design Professional from full range of industry colors.

2.7 INSTALLATION MATERIALS

- A. Resilient Base and Accessories:
1. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
 2. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Install floor tile according to manufacturer's written instructions.

- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 12-inches in length.
 - a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 12-inches in length.
 - a. Miter or cope corners to minimize open joints.

3.5 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

- A. Do not wax LVT.
- B. Do not wax vinyl roll flooring.
- C. Cover resilient products subject to wear and foot traffic until Material Completion.

END OF SECTION 09 65 00

SECTION 09 66 13 - PORTLAND CEMENT TERRAZZO FLOORING
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Poured-in-place portland cement terrazzo flooring and base.
2. Precast terrazzo units – stair tread/risers.

B. Related Requirements:

1. Section 07 92 00 "Joint Sealants" for sealants installed with terrazzo.

1.2 DEFINITIONS

- A. Aggregate: Marble chips, mirror chips or other types of aggregate.

1.3 PREINSTALLATION MEETINGS

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

1. Review methods and procedures related to terrazzo including, but not limited to, the following:
 - a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 - b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - c. Review special terrazzo designs and patterns.
 - d. Review procedures for coping with unfavorable forecasted weather conditions.

1.4 ACTION SUBMITTALS

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

- B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control-joint strips.
3. Expansion-joint strips.
4. Accessory strips.
5. Abrasive strips.
6. Stair treads, risers, and landings.
7. Precast terrazzo jointing and edge configurations.
8. Terrazzo patterns.

- C. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.
- D. Samples for Initial Selection: NTMA color as listed below.
- E. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in size indicated below:
 - 1. Terrazzo: 6-inch- (150-mm-) square Samples.
 - 2. Precast Terrazzo: 6-inch- (150-mm-) square Samples.
 - 3. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Material Certificates: For each type of terrazzo material or product, from manufacturer.

1.6 CLOSEOUT SUBMITTALS

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

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An installer who is a contractor member of NTMA.
- B. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups for terrazzo including accessories.
 - a. Size: Minimum 100 sq. ft. (9 sq. m) of typical poured-in-place flooring condition for each color and pattern in locations indicated in locations directed by Architect.
 - b. Include first three stair treads.
 - 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.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Maintain temperature above 50 deg F (10 deg C) for 48 hours before and during terrazzo installation.
- B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.
- C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- E. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

2.2 PORTLAND CEMENT TERRAZZO

- A. Portland Cement Terrazzo System: Monolithic.
 - 1. Underbed: Comply with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo system indicated for component proportions and mixing.
 - 2. Topping: Comply with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo system indicated for matrix and aggregate proportions and mixing.
 - a. Terrazzo Topping Thickness: As indicated.
 - b. Formulated Mix Color and Pattern (selected from NTMA's Standard palette for CEMENT matrix and an addition in TER-1-1 of 20% MIRROR #1-2):
 - 1) **TER-1** CI-1 with Mirror, white matrix.
 - 2) **TER-2** C11-17, medium gray matrix.
 - 3) **TER-3** C11-29, dark gray matrix.

B. Materials:

1. Portland Cement: ASTM C 150, Type 1.
 - a. Color for Exposed Matrix: As required by mix indicated and as approved by the Design Professional.
2. Water: Potable.
3. Sand: ASTM C 33/C 33M.
4. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.
 - a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
 - b. 24-Hour Absorption Rate: Less than 0.75 percent.
 - c. Dust Content: Less than 1.0 percent by weight.
5. Matrix Pigments: Pure mineral or synthetic pigments, alkali resistant, durable under exposure to sunlight, and compatible with terrazzo matrix.
6. Bonding Agent: Neat portland cement, or epoxy or acrylic bonding agents formulated for use with topping indicated.
7. Underbed Reinforcement: Galvanized welded-wire reinforcement, wire **2 by 2 inches (51 by 51 mm)** by **0.062 inch (1.57 mm)** in diameter, complying with ASTM A 185/A 185M and ASTM A 82/A 82M, except for minimum wire size.
8. Isolation Membrane: Polyethylene sheeting, ASTM D 2103, Type 13300, **4 mils (0.1 mm)** thick; or unperforated asphalt felt, ASTM D 226, Type I (No. 15).
9. Base: Coved up wall surface to a height of 4-inches of same color as adjacent flooring.
TERB.

2.3 PRECAST TERRAZZO

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Precast Terrazzo Enterprises, Inc.
 2. Romoco Precast Terrazzo Products; a subsidiary of Roman Mosaic & Tile Company.
 3. Wausau Tile Inc.
- B. Precast Terrazzo Units **TSTR**: Minimum **2-inches** thick, reinforced, portland cement terrazzo units. Comply with NTMA's written recommendations for fabricating precast terrazzo units in sizes and profiles indicated. Reinforce units as required by unit sizes, profiles, and thicknesses and as recommended by manufacturer. Finish exposed-to-view edges and reveals to match face finish. Ease exposed edges to **1/8-inch (3.2-mm)** radius.
 1. Stair treads and risers.
 2. Basis of Design: Model 555 from Precast Terrazzo Enterprises, Inc.
 3. Color, Pattern, and Finish: Match adjacent poured-in-place terrazzo flooring **TER-2**.

2.4 STRIP MATERIALS

- A. Standard Divider Strips: One-piece, flat-type strips for grouting into sawed joints prepared in substrate.
 1. Material: White-zinc alloy.
 2. Depth: **1-1/4 inches (32 mm)**.
 3. Width: **0.05 inch (1.27 mm) 1/8 inch (3.2 mm)**.

- B. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.
- C. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
 - 1. Edge-bead strips for exposed edges of terrazzo.
 - 2. Nosings for terrazzo stair treads and landings.
- D. Abrasive Strips: Three-line abrasive inserts at nosings. Silicon carbide or aluminum oxide, or combination of both, in epoxy-resin binder and set in channel.
 - 1. Width: **1/2 inch (12.7 mm)**.
 - 2. Depth: As required by terrazzo thickness.
 - 3. Length: **4 inches (100 mm)** less than stair width, centered.
 - 4. Color: As selected by Architect from full range of industry colors.

2.5 MISCELLANEOUS ACCESSORIES

- A. Strip Adhesive: Recommended by manufacturer for this use.
- B. Anchoring Devices:
 - 1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and as required for secure attachment to substrate.
 - 2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.
- C. Isolation and Expansion-Joint Material: Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, and non-outgassing in unruptured state; butyl rubber; rubber; or cork; in width indicated.
- D. Portland Cement Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by cleaner manufacturer for use on terrazzo type indicated.
- E. Sealer: Slip- and stain-resistant, solvent-based, penetrating-type sealer; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated. Coordinate this sealer with Owner's Maintenance Department.
 - 1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
 - 2. Acid-Base Properties: With pH factor between 7 and 10.
 - 3. Solvent-based sealer with High Gloss, 3 coats.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and 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, including levelness tolerances, have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
 - 1. Roughen concrete substrates before installing terrazzo system according to NTMA's written recommendations.
- B. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - 1. Moisture Testing: Perform tests indicated below.
 - a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - 1) Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform not less than two tests in each installation area and with test areas evenly spaced in installation areas.
 - b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.
 - c. Test Method: Test for moisture content by method recommended in writing by terrazzo manufacturer. Proceed with installation only after substrates pass testing.
- C. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 INSTALLATION, GENERAL

- A. Comply with NTMA's written recommendations for terrazzo and accessory installation.
- B. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet (6.4 mm in 3 m); noncumulative.
- C. Underbed:
 - 1. Comply with NTMA's "Terrazzo Specifications and Design Guide" for underbed installation.
 - 2. Cover entire surface to receive terrazzo with dusting of sand.

3. Install isolation membrane over sand, overlapping ends and edges a minimum of **3 inches (75 mm)**.
4. Install welded-wire reinforcement, overlapping at edges and ends at least two squares. Stop mesh a minimum of **1 inch (25 mm)** short of expansion joints.
5. Place underbed and screed to elevation indicated below finished floor elevation.

D. Strip Materials:

1. Divider and Control-Joint Strips:
 - a. Locate divider strips directly over control joints, breaks, and saw cuts in concrete slabs and in locations indicated.
 - b. Install control-joint strips back to back and directly above concrete-slab control joints.
2. Expansion-Joint Strips: Form expansion joints using divider strips and install directly above concrete-slab expansion joints.
3. Accessory Strips: Install as required to provide a complete installation.
4. Abrasive Strips: Install with surface of abrasive strip positioned **1/16 inch (1.6 mm)** higher than terrazzo surface.

3.4 POURED-IN-PLACE TERRAZZO INSTALLATION

- A. Pour in place and seed additional aggregates in matrix to uniformly distribute granular material and produce a surface with a minimum of 70 percent aggregate exposure. Cure and finish portland cement terrazzo according to NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.
- B. Grinding: Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.
- C. Grind to a 300 Diamond Finish, typical, with a 400 Diamond Finish on large areas of black/dark gray terrazzo.

3.5 PRECAST TERRAZZO INSTALLATION

- A. Install precast terrazzo units using method recommended by NTMA and manufacturer unless otherwise indicated.
- B. Do not install units that are chipped, cracked, discolored, or improperly finished.
- C. Seal joints between units with cement grout matching precast terrazzo matrix.

3.6 REPAIR

- A. Cut out and replace terrazzo areas that evidence lack of bond with substrate or underbed, including areas that emit a "hollow" sound if tapped. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.7 CLEANING AND PROTECTION

A. Terrazzo Cleaning:

1. Remove grinding dust from installation and adjacent areas.
2. Wash surfaces with cleaner immediately after final cleaning of terrazzo flooring according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.

B. Sealing:

1. Seal surfaces according to NTMA's written recommendations.
2. Apply sealer according to sealer manufacturer's written instructions.

C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Material Completion.

END OF SECTION 09 66 13

SECTION 09 68 13 – TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile and modular walk-off tiles.
- B. Related Requirements:
 - 1. Section 09 65 00 "Resilient Flooring, Base, and Accessories" for resilient wall base and accessories installed with carpet.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, and durability.
- B. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Type, color, and location of insets and borders.
 - 8. Type, color, and location of edge, transition, and other accessory strips.
 - 9. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Full-size Sample.
 - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12 inch (300 mm) long Samples.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 2 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Fire-Test Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups at locations and in sizes shown as directed by the Design Professional in two areas, not to exceed 100 square feet each.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

1.9 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.

- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Material Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE **(CPT-1)**:

- A. Subject to compliance with requirements, provide Philadelphia Commercial ENCODE, contact Garret Fricks 478-258-1789. Or provide a comparable product by one of the following as approved by the Architect:
 - 1. EF Contract, Flip Side.
 - 2. Mannington. Divergent Collection.
 - 3. Tarkett, Suede Tones 11531.
- B. Color As selected by the Design Professional from the Manufacturer's full offering.
- C. Yarn Content: Eco Solution Q Nylon.
- D. Dye Method: 100% Solution Dyed.
- E. Finished Pile Thickness: 0.222 inch.
- F. Size: 18 x 36 inches.
- G. Backing: Manufacturer's standard Synthetic, EcoWorx®.
- H. Instillation: Vertical Ashlar.

2.2 CARPET TILE **(CPT-2)**:

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Philadelphia Commercial 54860 STEP RIGHT IN, Contact Garret Fricks 478-258-1789. Or provide a comparable product by one of the following as approved by the Architect:
 - 1. EF Contract, Access.
 - 2. J&J Incognito.
 - 3. Tarkett Abrasive Action II.
- B. Color: As selected by the Design Professional from manufacturers full offering.
- C. Fiber Content: Eco Color Solution Q® Nylon.
- D. Fiber Type: Solution Dyed.
- E. Tufted Weight: 28 oz.
- F. Backing: EcoWorx®.
- G. Size: 24 x 24 inches.
- H. Installation Direction: Quarter turn.

2.3 CARPET TILE **(CPT-3)**: Auditorium

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Tandus Centiva Cache Tweed A0002 color Woven Cane 42714, Contact Angie Callahan 404-491-2583. Or a comparable product by one of the following as approved by the Architect:
 - 1. EF Contract.
 - 2. J&J.
 - 3. Mannington.
- B. Surface Texture: Tufted Patterned Loop
- C. Yarn Content: TDX®.
- D. Fiber Type: 100% Solution Dyed.
- E. Pile Height Average: 0.256 inch.
- F. Pattern Match: Not Required.
- G. Backing: Flex-Aire Modular® Cushion.
- H. Size: 9 x 36 inches.
- I. Installation Direction: Vertical Ashlar.
- J. Edge Trim: Provide resilient edge trim at corridors in Auditorium.

2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. (304.8 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using

solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- 1.** Heavy-duty, synthetic, textile wall covering, Felt.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.

C. Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, 12-inches wide by 12-inches long in size, minimum.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 2 percent of amount installed.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. 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.
 - b. Smoke-Developed Index: 450 or less.

2.2 HEAVY-DUTY, SYNTHETIC, TEXTILE WALL COVERING **TWC**

- A. Manufacturers: Subject to compliance with requirements, provide Basis of Design Product: Wolf Gordon FELTED/color Thundersnow GOH 13483610, contact: Les Cole 813-786-0678; or a comparable by one of the following:
 - 1. Filzfelt.
 - 2. Knoll Textiles.
- B. Test Responses:
 - 1. Colorfastness to Wet and Dry Crocking: Passes AATCC 8, Class 3, minimum.
 - 2. Colorfastness to Light: Passes AATCC 16 Test Option 1 or 3, Class 4, minimum, at 40 hours.
- C. Total Weight: 25 oz per linear yard.
- D. Width: 63-inches.
- E. Fiber: 100% Polyester with Fused Polyester backing.
- F. NRC: 0.20.
- G. Colors, Textures, and Patterns: Match Architect's samples.

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 3. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 4. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Install seams vertical and plumb at least **6 inches (150 mm)** from outside corners and **6 inches (150 mm)** from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- F. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

SECTION 09 84 33 - SOUND AFFECTING WALL AND CEILING UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
 - 1. Sound-absorbing ceiling panels.
 - 2. Sound-absorbing panels with standard and special printed fabric.
 - 3. Sound-deflecting panels with fabric covering.
 - 4. Hanging baffles.
 - 5. Foam panels.

1.2 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include fabric facing, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For unit installation.
 - 1. Include elevations, sections, and mounting devices and details.
 - 2. Include details at panel head, base, and corners. Indicate panel edge profile and core materials.
 - 3. Include direction of fabric weave and pattern matching.
 - 4. Include suspension details.
- C. Samples for Initial Selection: For each type of fabric facing.
 - 1. Include Samples of hardware and accessories involving color or finish selection.
- D. Samples for Verification: For the following products:
 - 1. Fabric: 12 inch x 12 inch Sample, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
 - 2. Foam Panels.

3. Mounting Devices: 6 inches in length.
4. Assembled Panels: Approximately 12 by 12 inches, including mounting methods.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Electrical outlets, switches, and thermostats.
 2. Items to be coordinated with including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Alarms.
 - e. Sprinklers.
 - f. Access panels.
 - g. Switches.
- B. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups in location(s) as selected by the Design Professional, to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.
 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient

temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- B. Lighting: Do not install units until a permanent level of lighting is provided on surfaces to receive the units.
- C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication and indicate them on Shop Drawings.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to the following:
 - a. Acoustical performance.
 - b. Fabric sagging, distorting, or releasing from panel edge.
 - c. Warping of core.
 - 2. Warranty Period: Two years from date of Material Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; 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: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.2 SOUND-ABSORBING UNITS

- A. Sound-Absorbing Ceiling Panels **AWP-1A**: Manufacturer's standard panel construction consisting of facing material of white, acoustically transparent covering, field painted as part of this project at the Direction of the Design Professional.

1. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Conwed Designscape; an Owens Corning company](#), Foundations Direct Attach Ceiling Panels, contact: Bill Cherry 800-676-0843, or comparable product by one of the following:
 - a. [Armstrong World Industries](#).
 - b. [Golterman & Sabo](#).
 2. Panel Shape: Flat.
 3. Mounting - ceilings: As units attached to the underside of plaster ceilings: metal z-clips and adhesive as recommended by the manufacturer for plaster ceilings.
 4. Core: 6-7 lb/cu. ft. Glass-fiber board.
 - a. Core-Face Layer: 1/8-inch high density 16-20 pcf fiberglass core face layer.
 5. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
 6. Edge Profile: Square.
 7. Corner Detail in Elevation: Square with continuous edge profile indicated.
 8. Nominal Core Thickness: 2 1/8- inches.
 9. Face: Paintable in the field scrim.
 10. Panel Width: As indicated on Drawings.
 11. Panel Length: As indicated on Drawings.
 12. Locations: Classroom Ceilings; Auditorium Ceiling.
- B. Sound-Absorbing Tackable Wall Panels **AWP-1B**: Manufacturer's standard panel construction consisting of facing material of white, acoustically transparent covering, field painted as part of this project at the Direction of the Design Professional.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Conwed Designscape; an Owens Corning company](#), Foundations Direct Attach Wall Panels, contact: Bill Cherry 800-676-0843, or comparable product by one of the following:
 - a. [Armstrong World Industries](#).
 - b. [Golterman & Sabo](#).
 2. Panel Shape: Flat.
 3. Mounting - ceilings: As units attached to the underside of plaster ceilings: metal z-clips and adhesive as recommended by the manufacturer for plaster ceilings.
 4. Mounting - walls: Back mounted with manufacturer's standard metal Z-clips to Z-clip bar, secured to substrate.
 5. Core: 6-7 lb/cu. ft. Glass-fiber board.
 - a. Core-Face Layer: 1/8-inch high density 16-20 pcf fiberglass core face layer.
 6. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
 7. Edge Profile: Square.
 8. Corner Detail in Elevation: Square with continuous edge profile indicated.
 9. Nominal Core Thickness: 2 1/8- inches.
 10. Panel Width: As indicated on Drawings.
 11. Face: Paintable in the field scrim.
 12. Panel Height: As indicated on Drawings.
 13. Locations: Classroom Walls.
- C. Sound-Absorbing Wall Panel **AWP-2A & 2B**: Manufacturer's standard panel construction consisting of special printed facing material adhered to front face of standard panel.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide Conwed Designscape; an Owens Corning Coring, ~~Foundations Direct Attach Wall Panels A200~~, contact: Bill Cherry 800-676-0843, or comparable product by one of the following as approved by the Architect:
 - a. [Armstrong World Industries](#).
 - b. [Golterman & Sabo](#).

2. Panel Shape: Flat.
 3. Mounting: Back mounted with manufacturer's standard, metal Z-clips to Z-clip bar secured to substrate.
 4. Edge Profile: Square.
 5. Edge Construction: Manufacturer's standard.
 6. Corner Detail in Elevation: Square with continuous edge profile.
 7. **AWP-2A Facing Material:** Guilford FR701-2100, two colors to be used (Cement Mix 750 and Claret Accent 418); multiple sizes as shown on the drawings.
 8. **AWP-2B Facing Material:** Arc Com GRAND HARLEQUIN AC#93874B, color Rose, 100% Polyester, 54" wide; contact Sara Gunther, 904-574-3692.
 9. Nominal Overall Panel Thickness: 2 1/8- inches.
 10. Panel Width: As indicated on Drawings.
 11. Panel Height: As indicated on Drawings.
 12. Location: Auditorium Walls.
- D. Sound-Absorbing Wall Panel **AWP-3:** Manufacturer's standard panel impact resistant construction.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide Conwed Designscape; an Owens Corning Coring, Respond® IR Wall Panels, contact Bill Cherry 800-676-0843, or comparable product by one of the following as approved by the Architect:
 - a. [Armstrong World Industries.](#)
 - b. [Golterman & Sabo.](#)
 2. Panel Shape: Flat.
 3. Mounting: Back mounted with manufacturer's standard, metal Z-clips to Z-clip bar secured to substrate. Edge Profile: Square.
 4. Edge Construction: Manufacturer's standard.
 5. Corner Detail in Elevation: Square with continuous edge profile.
 6. **AWP-3 Facing Material:** Architex Tinseltown, color Dolby Theatre, 55-inches wide, 100% Polyester. Contact Rich Marino 770-633-0825.
 7. Nominal Overall Panel Thickness: 2 inches.
 8. Panel Width: As indicated on Drawings.
 9. Panel Height: As indicated on Drawings.
 10. Location: Auditorium Walls.

2.3 SOUND-DIFFUSING WALL UNITS

- A. Sound-Diffusing Wall Panel **AWP-4:** Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Conwed Designscape; an Owens Corning company](#); Respond Diffusers: Barrel, contact Bill Cherry 800-676-0843, or a comparable product by one of the following:
 - a. [Armstrong World Industries.](#)
 - b. [Golterman & Sabo.](#)
 2. Panel Shape: Barrel.
 3. Mounting: Back mounted with manufacturer's standard, secured to substrate.
 4. Core: Fire-retardant formed plastic, prepared for required acoustical performance.
 5. Facing Material: Guilford FR701-2100, color Cement Mix 750 and Claret Accent 418.
 6. Panel Width: As indicated on Drawings.
 7. Panel Height: As indicated on Drawings.
 8. Location: Auditorium Walls.

2.4 FOAM PANELS

- A. Sound-Absorbing Wall Panel **AWP-5**: Manufacturer's standard panel construction consisting of open cell melamine-based foam, fireproof material.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Sonex Valueline wall panels, contact Sonex-Online, 800-662-0032, or a comparable product by one of the following:
 - a. Acoustical Solutions, Pinta Acoustic Sonex Classic Foam Panels. 855-297-8267.
 - b. Sound Isolation Company, Pinta Sonex Acoustical Foam Panels. 888-666-5090.
 2. Content: Fireproof melamine acoustical foam.
 3. NRC Rating: 0.75 NRC.
 4. Colors: Colortec/Black Mist.
 5. Fire Rating: ASTM E84, Class-A Fire Rated.
 6. Shape: Rectangular.
 7. Mounting: Individually adhered panels, mounted with manufacturer's standard mounting adhesive.
 8. Panel Thickness: 2-inches (50 mm).
 9. Panel Size: 2' x 4' As indicated on Drawings.
 10. Location: Film CR Editing Rooms walls.

2.5 MATERIALS

- A. Core Materials: Manufacturer's standard.
1. Conwed: Glass-Fiber Board: ASTM C 612; of type standard with manufacturer; nominal density of 6 to 7 lb/cu. ft., unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
 2. Impact-Resistant, Acoustically Transparent, Copolymer Sheet for Face Layer: 1/16- to 1/8-inch- thick layer of perforated, noncombustible face of core.
 3. Baffles: Recycled and virgin PET (Polyethylene Terephthalate).
 4. Foam Panels: Melamine-based foam, fireproof material.
- B. Mounting Devices: As recommended by manufacturer to support weight of unit, and as follows:
1. Manufacturer's standard impaling clips and adhesive for mounting to the ceiling.
 2. Metal Clips or Bar Hangers: Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of unit and the other part to substrate, designed to permit unit removal.
 3. 'Tectum' mounting devices for PET panels. See Drawings for details.

2.6 FABRICATION OF CONWED PANELS

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.
- B. Edge Hardening: For glass-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.
- C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

- D. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
 - 1. Square Corners: Tailor corners.

- E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
 - 1. Thickness.
 - 2. Edge straightness.
 - 3. Overall length and width.
 - 4. Squareness from corner to corner.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 84 33

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Concrete.
 - 2. Clay masonry.
 - 3. Steel and iron.
 - 4. Galvanized metal.
 - 5. Wood.

1.2 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.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Include written instructions for the priming and painting of "Hardie Board" – Exterior Fiber Cement Board.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) 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.

- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

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

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Paints.
 - 3. Sherwin-Williams Company (The).
- B. Products: Subject to compliance with requirements, provide product(s) listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. 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.
- C. Colors: Match Architect's samples.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. 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.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. 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.
- E. 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.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
 - 1. SSPC-SP 2.

2. SSPC-SP 3.
 3. SSPC-SP 7/NACE No. 4.
 4. SSPC-SP 11.
- G. 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.
- H. 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.
- I. 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.

3.3 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.
 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 4. Paint entire exposed surface of window frames and sashes.
 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- 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 and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.

3.4 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.

3.5 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.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Latex System MPI EXT 3.1A:
 - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11.
- B. Concrete Substrates, Traffic Surfaces:
 - 1. Latex Deck Coating System MPI EXT 3.2B:
 - a. Prime Coat: As recommended in writing by topcoat manufacturer.
 - b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
 - c. Topcoat: Deck coating, latex, MPI #127.
- C. Clay Masonry Substrates:
 - 1. Latex System MPI EXT 4.1A:
 - a. Prime Coat: Latex, exterior, matching topcoat.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11.
- D. Steel and Iron Substrates:
 - 1. Quick-Dry Enamel System MPI EXT 5.1A:
 - a. Prime Coat: Primer, alkyd, quick dry, for metal, MPI #76.
 - b. Intermediate Coat: Alkyd, quick dry, matching topcoat.
 - c. Topcoat: Alkyd, quick dry, semi-gloss (MPI Gloss Level 5), MPI #81.
- E. Galvanized-Metal Substrates:
 - 1. Water-Based Light Industrial Coating System MPI EXT 5.3J:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, and matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.
- F. Wood Substrates: Wood trim and Wood board siding.
 - 1. Latex System MPI EXT 6.3A:
 - a. Prime Coat: Primer, alkyd for exterior wood, MPI #5.
 - b. Intermediate Coat: Acrylic Latex, exterior, matching topcoat.
 - c. Topcoat: Acrylic Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15 (Ceilings).
 - d. Topcoat: Acrylic Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11. (Trim and Siding).

END OF SECTION 09 91 13

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMUs).
 - 3. Steel and iron.
 - 4. Galvanized metal.
 - 5. Wood.
 - 6. Plastic.
 - 7. Gypsum board.

1.2 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 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. 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.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) 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.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless the Design Professional specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

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

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Paints.
 - 3. Sherwin-Williams Company (The).
 - 4. Crescent Bronze Metallic paint Chromatone® (SW) for raised decoration at proscenium arch.
- B. Products: Subject to compliance with requirements, provide product(s) listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. 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.
- C. Colors: Match Architect's samples.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. 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.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

- D. 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.
- E. 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.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
 - 1. SSPC-SP 2.
 - 2. SSPC-SP 3.
 - 3. SSPC-SP 7/NACE No. 4.
 - 4. SSPC-SP 11.
- G. 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.
- H. 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.
- I. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 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.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 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.

3.5 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.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Institutional Low-Odor/VOC Latex System MPI INT 3.1M:
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, flat (MPI Gloss Level 1), MPI #143.
- B. Concrete Substrates, Traffic Surfaces:
 - 1. Water-Based Concrete Floor Sealer System MPI INT 3.2G:
 - a. First Coat: Sealer, water based, for concrete floors, matching topcoat.
 - b. Topcoat: Sealer, water based, for concrete floors MPI #99.
- C. CMU Substrates:
 - 1. Latex System MPI INT 4.2E:
 - a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - c. Topcoat: Institutional low-odor/VOC interior latex (MPI Gloss Level 3), MPI #145.
- D. Steel Substrates:
 - 1. Institutional Low-Odor/VOC Latex System MPI INT 5.1S:
 - a. Prime Coat: Primer, rust inhibitive, water based MPI #107.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.
- E. Galvanized-Metal Substrates:
 - 1. Institutional Low-Odor/VOC Latex System MPI INT 5.3N:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.
- F. Handrails, Stair Risers, Stringers and Underside of Stairs where visible:
 - 1. Products: Polyurethane, Two-Component, Pigmented, Gloss, MPI #72:
 - a. Benjamin Moore & Co.; Aliphatic Acrylic Urethane Gloss, CM74/M75.
 - b. PPG Architectural Finishes, Inc.: Pitthane, Urethane Aliphatic Pigmented Gloss, 95-850.
 - c. Sherwin-Williams: Protective & Marine Acrolon 218 HS
- G. Wood Substrates: Trim
 - 1. Institutional Low-Odor/VOC Latex System MPI INT 6.5B:
 - a. Prime Coat: Primer, latex, for interior wood, MPI #39.

- b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.
- H. Wood Substrates: Traffic surfaces, including previously painted floors and stairs (Stage flooring).
- 1. Previously Coated Wood Floors, Pigmented Finish System MPI INT 6.5J:
 - a. Prime Coat: Primer, latex, for wood, MPI 45.
 - b. Intermediate Coat: Latex porch and floor low gloss enamel finish, MPI 60, matching topcoat.
 - c. Topcoat: Latex porch and floor low gloss enamel finish, MPI 60, flat (MPI Gloss Level 1).
- I. Plastic Substrates:
- 1. Institutional Low-Odor/VOC Latex System MPI INT 6.8F:
 - a. Prime Coat: Primer, bonding, solvent based, MPI #69.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.
- J. Gypsum Board Substrates:
- 1. Institutional Low-Odor/VOC Latex System MPI INT 9.2M:
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.
- K. Plaster Substrates:
- 1. Institutional Low-Odor/VOC Latex System MPI INT 9.2M:
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.
 - 2. Dry Fall Paint System MPI INT 5.1CC:
 - a. Prime Coat: As directed by manufacturer in writing.
 - b. Intermediate Coat: ProIndustrial Waterborne Acrylic Dryfall (MPI Gloss Level 1), MPI #226.
 - c. Topcoat: ProIndustrial Waterborne Acrylic Dryfall (MPI Gloss Level 1), MPI #226.
- L. Proscenium Arch Plaster Substrates:
- 1. Water-reducible Latex:
 - a. Prime Coat: Primer sealer, manufacturer's standard.
 - b. Intermediate Coat: Chromatone® vinyl acrylic water-based decorative coating matching topcoat.
 - c. Topcoat: Chromatone® vinyl acrylic water-based decorative coating.

END OF SECTION 09 91 23

SECTION 09 96 10 - HIGH-PERFORMANCE WATER-BASED COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of high-performance latex-based coating systems (WEPT) on the following substrates:
 - 1. Interior Substrates:
 - a. Concrete, vertical surfaces.
 - b. Concrete masonry units (CMUs).
- B. Related Requirements:
 - 1. Section 09 91 13 "Exterior Painting" for general field painting.
 - 2. Section 09 91 23 "Interior Painting" for general field painting.
 - 3. Section 09 96 00 "High-Performance Water-Based Coatings for solvent-based epoxy coating.

1.2 DEFINITIONS

- A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
 - 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.

- D. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

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

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Architectural Finishes, Inc.
 - 3. Sherwin-Williams Company (The).

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. 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.
3. Products shall be of same manufacturer for each coat in a coating system.

C. Colors: Match Design Professional's samples.

2.3 BLOCK FILLERS

A. Block Filler, Epoxy: MPI #116.

2.4 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. 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.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 1. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.
 - 1. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.

3.3 PREPARATIONS OF CMU SUBSTRATES

- A. Block Filler: Fill voids and depressions in block and mortar joints to full flush condition.
 - 1. Apply the surfacer (8 mils wet – 3.2 mils dry) using a 1-1/4" roller nap until voids appear to be filled. Immediately squeegee the entire surface using a 7-inch to 0-inch squeegee in a figure eight motion to push filler into all voids and create a flush surface. Allow to dry according to manufacturer's recommendations, but not less than two hours or more than four hours. Sand to remove edges and irregularities. Recoat and repeat process as necessary to fill all voids flush with surface.
- B. Primer/Sealer Coats: Before application of finish coats, apply a prime coat, as recommended by the manufacturer, to material required to be coated or finished, and which has not been prime coated by other.
 - 1. Fill voids and depressions in block and mortar joints to full flush condition.
 - 2. Recoat primed and sealed substrates where there is evidence of suction spots or unsealed areas in the first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

3.4 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for coating and substrate indicated.
 - 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.5 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
 - 1. Contractor shall touch up and restore coated surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.6 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Design Professional, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.7 INTERIOR HIGH-PERFORMANCE WATER-BASED COATING SCHEDULE

A. CMU Substrates: (Restrooms, Kitchen, Corridors)

1. Epoxy System MPI INT 4.1G:

- a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
- b. Intermediate Coat: Epoxy, matching topcoat.
- c. Topcoat: Epoxy, gloss level 3, (Semi-gloss) MPI #115.

END OF SECTION 09 96 10

SECTION 10 11 00 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Markerboards (**MB-1, MB-2**).
 - 2. Tackboards (**TB**).

1.2 SUBMITTALS

- A. Product Data: For each type of visual display board indicated.
- B. Shop Drawings: For each type of visual display board required.
 - 1. Include sections of typical trim members.
 - 2. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
- C. Samples: Of the following products, showing color and texture or finish selected. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected. Prepare Samples from the same material to be used for the Work.
 - 1. Visual Display Boards: Sample panels not less than 8-1/2 by 11 inches, mounted on the substrate indicated for the final Work. Include a panel for each type, color, and texture required.
 - 2. Aluminum Trim and Accessories: Samples of each finish type and color, on 6-inch-long sections of extrusions and not less than 4-inch squares of sheet or plate. Where finishes involve normal color and texture variations, include sets showing the full range of variations expected.
- D. Product Certificates: Signed by manufacturers of tackboards certifying that plastic-impregnated cork tackboard materials furnished comply with requirements specified for flame-spread ratings.

1.3 PROJECT CONDITIONS

- A. Field Measurements: Verify field measurements before preparation of Shop Drawings and before fabrication to ensure proper fitting. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.4 WARRANTY

- A. General Warranty: The special porcelain enamel markerboard warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Porcelain Enamel Markerboard Warranty: Submit a written warranty executed by manufacturer agreeing to replace porcelain enamel markerboards that do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking, or flaking within the specified warranty period, provided the manufacturer's written instructions for handling, installation, protection, and maintenance have been followed.
 - 1. Warranty Period: 50 years from date of Material Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
 - 1. Porcelain Enamel Markerboards and Tackboards.
 - a. Platinum Visual Systems.
 - b. American Visual Display Products, a division of American Construction Specialties, LLC.
 - c. Claridge Products and Equipment.
 - d. Ghent Manufacturing.

2.2 MATERIALS

- A. Porcelain Enamel Markerboards: Balanced, high-pressure-laminated, porcelain enamel markerboards of 3-ply construction consisting of face sheet, core material, and backing.
 - 1. Face Sheet: 0.024-inch enameling grade steel especially processed for temperatures used in coating porcelain on steel. Coat exposed face and edges with a 3-coat process consisting of primer, ground coat, and color cover coat. Coat concealed face with a 2-coat process consisting of primer and ground coat. Fuse cover and ground coats to steel at manufacturer's standard firing temperatures, but not less than 1200 deg F.
 - a. Cover Coat for Markerboards: Provide manufacturer's standard, white, special writing surface with gloss finish intended for use with erasable dry markers.
 - 2. Core: 3/8-inch- thick, particleboard core material complying with requirements of ANSI A208.1, Grade 1-M-1.
 - 3. Backing Sheet: 0.015-inch- thick, aluminum-sheet backing.
 - 4. Laminating Adhesive: Manufacturer's standard, moisture-resistant, thermoplastic-type adhesive.
- B. Plastic-Impregnated Cork Tackboards: Seamless sheet, 1/4-inch- thick, ground natural cork compressed with a resinous binder with washable vinyl finish and integral color throughout, laminated to burlap backing. Provide color and texture as scheduled or as selected by the Architect from manufacturer's standards.
- C. Extruded Aluminum: ASTM B 221, Alloy 6063.
- D. Markerboard Size: Overall – 4'-0" high by 8'-0" wide (long). **MB-1**
- E. Tackboard Size: Overall – 4'-0" by 4'-0". **TB-1**
- F. **MB-2:** Special Purpose Graphics: Fuse or paint music staff lines graphic onto surface of porcelain-enamel visual display unit in locations as indicated on the Drawings.

2.3 ACCESSORIES

- A. Metal Trim and Accessories: Fabricate frames and trim of not less than 0.062-inch- thick, extruded-aluminum alloy, to suit type of installation. Provide straight, single-length units. Keep joints to a minimum. Miter corners to a neat, hairline closure.
 - 1. Markertray: Manufacturer's standard, continuous, box-type, aluminum tray with slanted front and cast-aluminum end closures for each markerboard.
 - 2. Map Rail: Furnish map rail at top of each markerboard unit, complete with the following accessories:
 - a. Display Rail: Provide continuous cork display rail approximately 1 or 2 inches wide, integral with map rail.

- b. End Stops: Provide one end stop at each end of map rail.
- c. Map Hooks: Provide 2 map hooks for every 48 inches of map rail or fraction thereof.
- d. Flag Holder: Provide one flag holder for each room.

2.4 FABRICATION

- A. Porcelain Enamel Markerboards: Laminate facing sheet and backing sheet to core material under pressure with manufacturer's recommended flexible, waterproof adhesive.
- B. Assembly: Provide factory-assembled markerboard and tackboard units.
- C. Tackable Display Surface:
 - 1. Fabricate with minimum number of joints, balanced around center of board, as acceptable to the Design Professional.
 - 2. Provide manufacturer's standard vertical joint system between abutting sections of markerboards.
 - 3. Fabrication: Fabricate panels to sizes and configurations indicated.

2.5 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall surfaces, with Installer present, for compliance with requirements and other conditions affecting installation of visual display boards.
 - 1. Surfaces to receive markerboards shall be free of dirt, scaling paint, and projections or depressions that would affect smooth, finished surfaces of markerboards.
 - 2. Surfaces to receive tackboards shall be dry and free of substances that would impair the bond between tackboards and substrate.
 - 3. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible.
- B. Install units in size(s), locations and at mounting heights indicated and according to manufacturer's written instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.3 ADJUSTING AND CLEANING

- A. Verify that accessories required for each unit have been properly installed and that operating units function properly.
- B. Clean units according to manufacturer's written instructions.

END OF SECTION 10 11 00

SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section include the following:
 1. Room Identification Signs.
 2. Exterior Signs.
 3. Dimensional Letters.
 4. Vinyl Graphics.

SUMMARY OF SIGN TYPES

Abbrev	Name	See Diagram	Notes
A	Unisex Restroom	A	Include HC access symbol
M	Men	M	Include HC access symbol
W	Women	W	Include HC access symbol
NA	No Admittance	NA	Locate center of door
R1	Room sign number only	R1	
R2	Room sign with number and changeable insert	R2	
R3	Room sign with permanent name & number panels	R3	
E	Exterior sign with number only	E	
VG	Vinyl graphics on glass	x	See Sheet XXX

1.2 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs.
 1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 2. Provide message list, tpestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

1. Acrylic sheet.
2. Dimensional letters.
- D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
 1. Acrylic Sheet: 4 by 4 inches (100 by 100 mm) for each color required.
 2. Dimensional letters.
- E. Sign Schedule: Use same designations indicated on Drawings.
- F. Qualification Data: For Installer and fabricator.
- G. Maintenance Data: For signs to include in maintenance manuals.
- H. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Five years from date of Material Completion.

PART 2 - PRODUCTS

2.1 SIGNS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. APCO Graphics, Inc.
 2. ASI-Modulex, Inc.
 3. InPro Corporation.
 4. Whitfield Signs Statesboro.

- B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, that match existing signs, complying with the following requirements:
1. Acrylic Sheet: 0.080 inch (2.03 mm) thick.
 2. Edge Condition: Square cut.
 3. Corner Condition: Radius.
 4. Mounting: Un-framed.
 - a. Wall mounted with visible attachments.
 - b. Manufacturer's standard anchors for substrates encountered.
 - c. Provide blank backing for signs mounted on glass.
 5. Color: As selected by the Architect from manufacturer's full offering and to match existing.
 6. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch (0.8 mm) above surface with contrasting colors.
- C. Tactile and Braille Sign: Manufacturer's standard process for producing text and symbols complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with domed or rounded shape.
1. Panel Material: Clear acrylic sheet with opaque color coating, subsurface applied.
- D. Raised-Copy Thickness: Not less than 1/32 inch (0.8 mm).

2.2 EXTERIOR DOOR SIGNAGE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. APCO Graphics, Inc.
 2. ASI-Modulex, Inc.
 3. InPro Corporation.
 4. Whitfield Signs Statesboro.
- B. Exterior Door Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements:
1. Zinc: Etched plaque with raised text (no braille).
 2. Edge Condition: Square cut.
 3. Corner Condition: Square cut.
 4. Mounting: Un-framed.
 - a. Wall mounted with corner stud mounts and 100% silicone adhesive.
 - b. Manufacturer's standard anchors for substrates encountered.
 - c. Provide blank backing for signs mounted on glass.
 5. Color: As selected by the Architect from manufacturer's full offering.

2.3 DIMENSIONAL LETTERING MATERIALS

- A. Fabricated Channel Characters: Metal face and side returns, formed free from warp and distortion; with uniform faces, sharp corners, and precisely formed lines and profiles; internally braced for stability and for securing fasteners.
- B. Aluminum Sheet and Plate: **ASTM B 209 (ASTM B 209M)**, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Material Thickness: Manufacturer's standard for size and design of character.
 - 1. Character Height: As indicated.
 - 2. Character Depth: As indicated.
- D. Typeface: Lithos Pro Regular or as selected by the Architect.
- E. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from RAL's full range to match school color.
- F. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
 Use concealed fasteners and anchors for exterior exposure.

2.4 PANEL SIGN SCHEDULE - EXISTING BUILDING

- 1. Allow for twelve (12) signs to match existing.
- 2. Install where room signs are missing, type NA, R1, R2, or R3 as directed by the Design Professional.

2.5 PANEL SIGN SCHEDULE - CAFETERIA

SIGN#	TYPE	MESSAGE (Number & Text)	SPACE/AREA	NOTES
1	R3	STORAGE	110 Table & Chair Storage	
2	NA	NO ADMITTANCE	109 IDF	
3	W	WOMEN	108 Women	
4	R3	JANITOR	106 Janitor	
5	M	MEN	105 Men	
6	NA	NO ADMITTANCE	111 Serving	
7	R3	CHEM. STORAGE	114 Chem. Stor.	
8	R2	OFFICE	117 Office	Mount on Glass
9	R2	OFFICE	118 Office	Mount on Glass
10	R2	OFFICE	119 Office	Mount on Glass
11	R3	DRY STORAGE	124 Dry Storage	
12	R3	LOCKERS	121 Lockers	
13	A	RESTROOM	122 Tlt.	
14	E	XXXX	115 Elect.	

15	E	XXXX	120 Receiving	
16	E	XXXX	123 Riser Room	
17	E	XXXX	104 Corridor	
18	E	XXXX	100 Vestibule	Mount on Glass
19	E	XXXX	100 Vestibule	Mount on Glass
20	E	XXXX	138 Dining – North	
21	E	XXXX	103 Dining Circulation	

2.6 ACCESSORIES

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.7 FINISHES, GENERAL

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

2.8 ACRYLIC SHEET FINISHES

- A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items including anchor inserts are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply. Match existing mounting method both interior and exterior.
1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
 2. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.
- C. Dimensional Letters: Install in Auditorium, above the Proscenium Arch, coordinate installation with Design Professional.
1. Install signs level, plumb, true to line, and at location and height indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

3.4 SIGNAGE DRAWINGS

Sign Type A



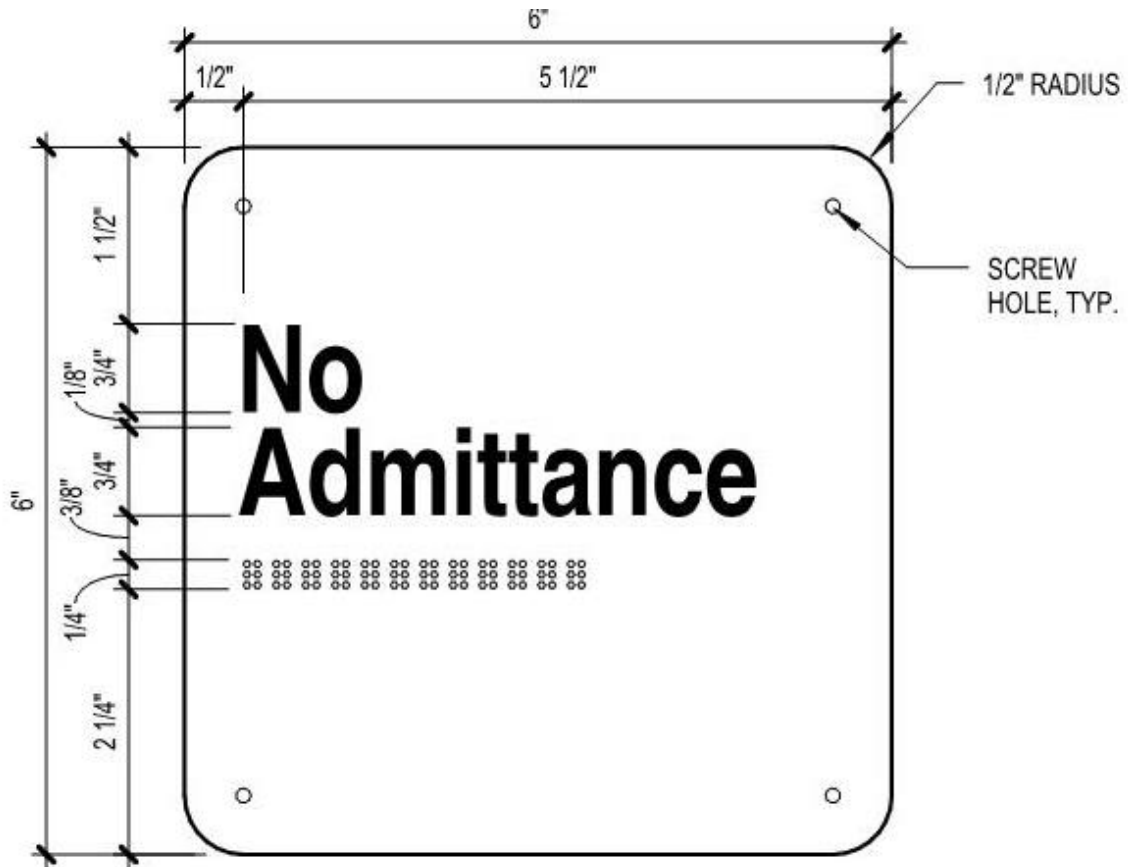
Sign Type M



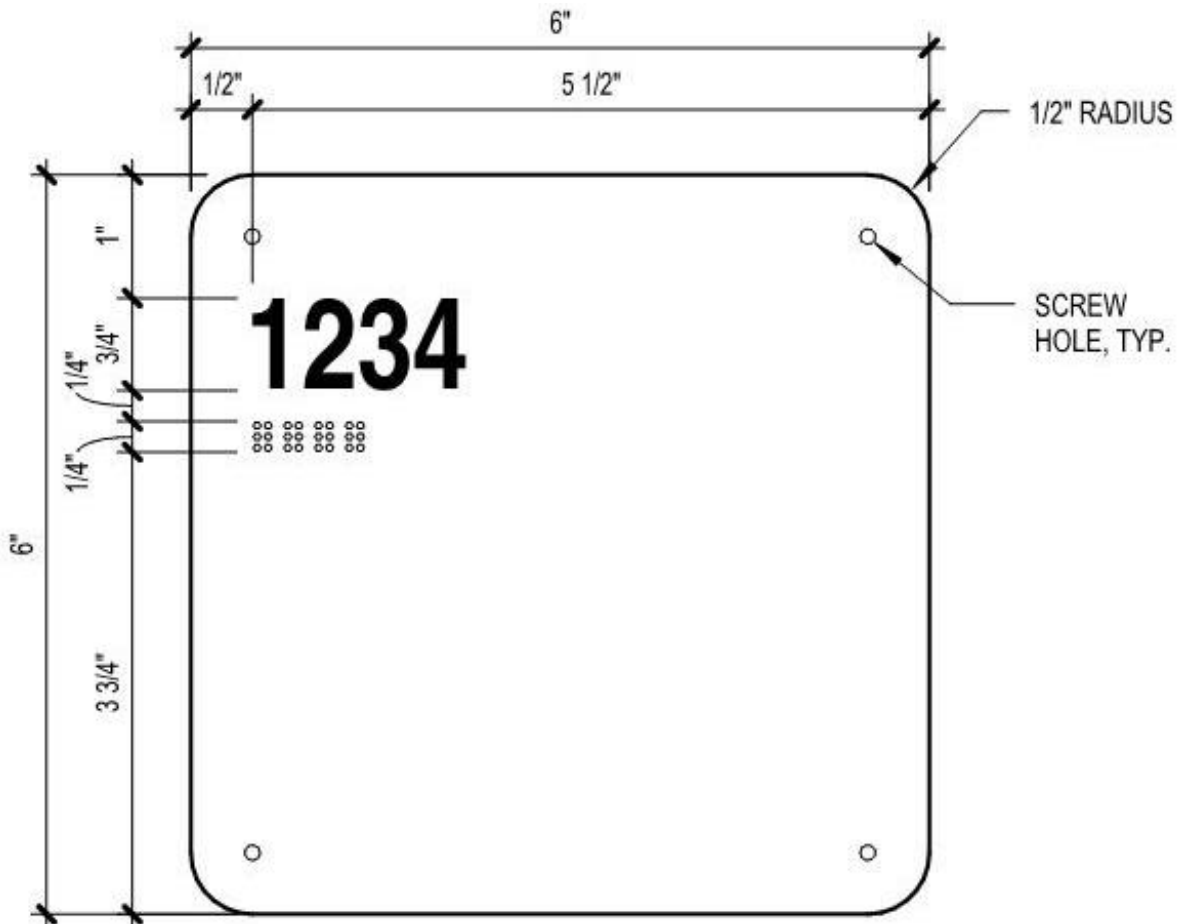
Sign Type W



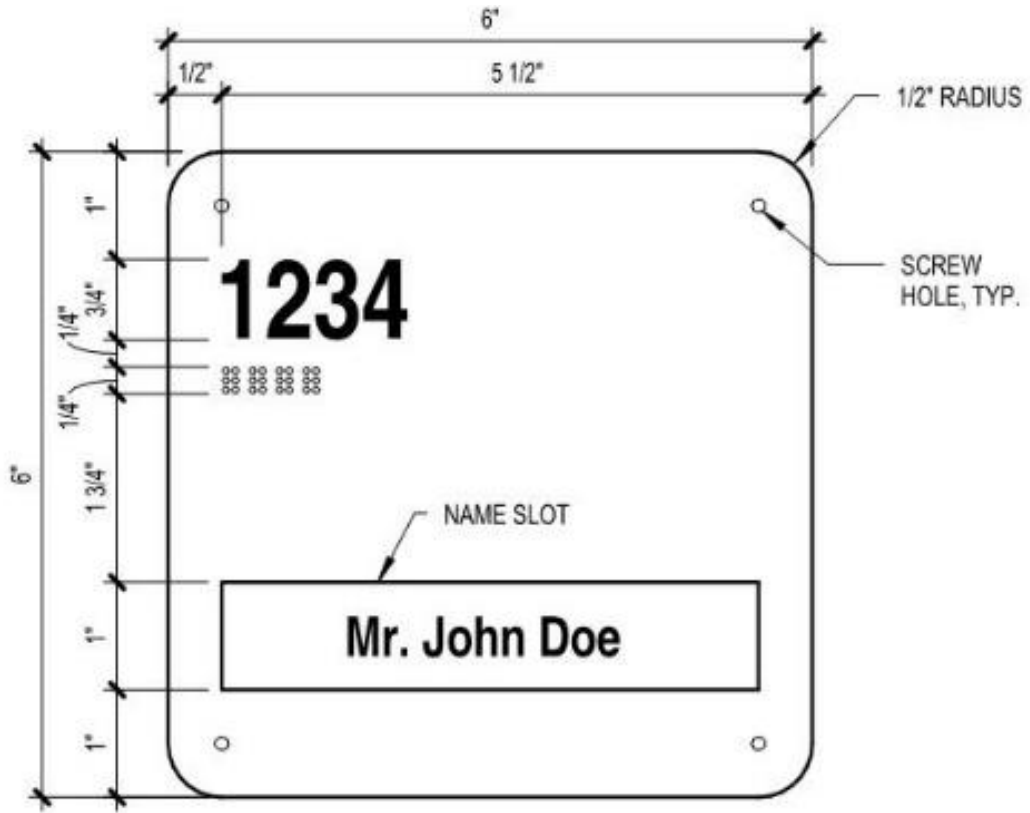
Sign Type NA



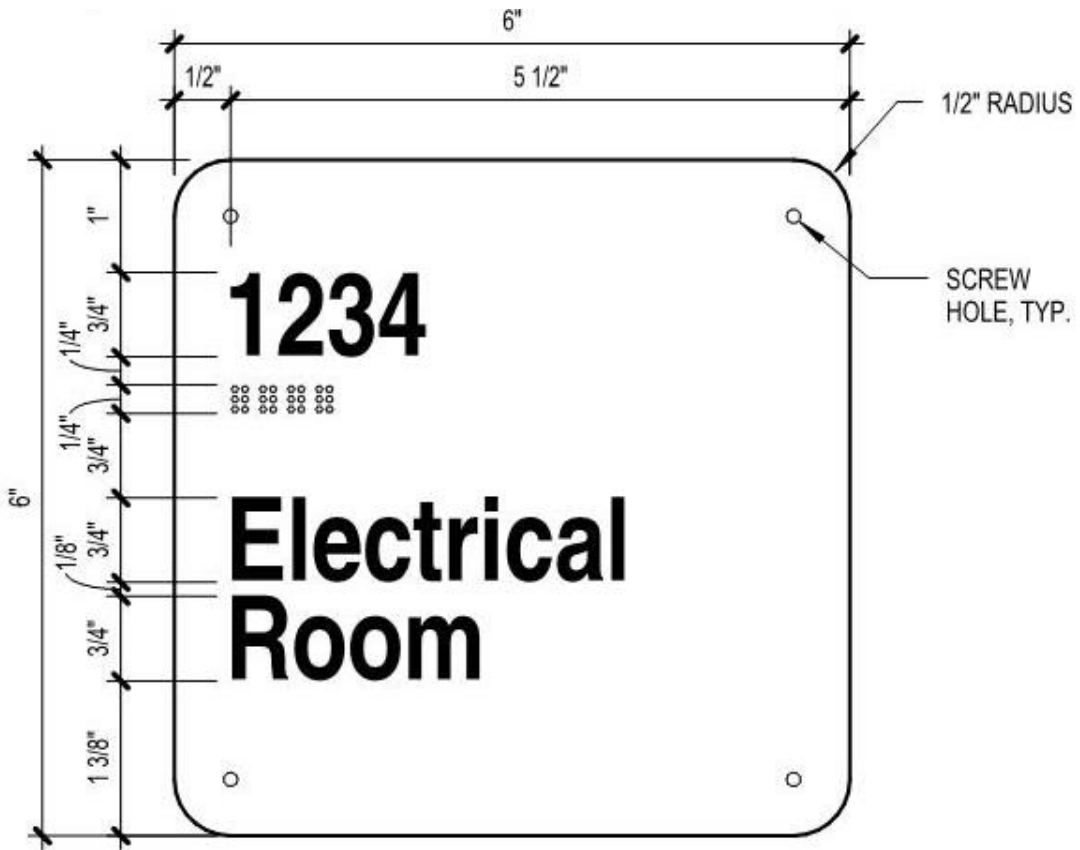
Sign Type R1



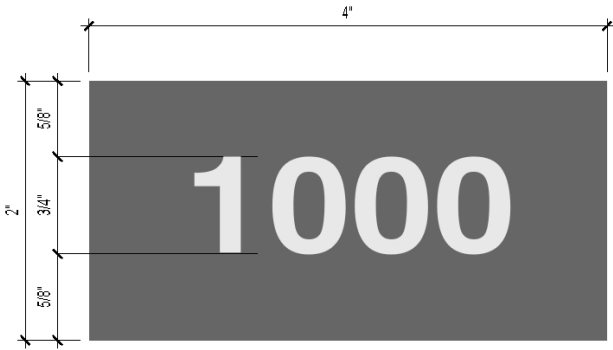
Sign Type R2



Sign Type R3



Sign Type E (EXTERIOR ONLY)



END OF SECTION 10 14 00

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

B. Related Requirements:

1. Section 10 28 00 "Toilet and Bath Accessories" for grab bars and similar accessories mounted on toilet compartments.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

B. Shop Drawings: For toilet compartments.

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of centerlines of toilet fixtures.
4. Show locations of floor drains.
5. Show overhead support or bracing locations.

C. Samples for Initial Selection: For each type of toilet compartment material indicated.

1. Include Samples of hardware and accessories involving material and color selection.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for toilet compartments, prepared on 3 inch (76 mm) square Samples of same thickness and material indicated for Work.

E. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 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: 75 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following matching finish of the Basis of Design:
 - 1. Accurate Partitions Corp.
 - 2. Global Partitions.
 - 3. Scranton Products.
- B. Toilet-Enclosure Style: Overhead braced and Floor anchored.
- C. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
 - 1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
 - 2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 - 3. Color and Pattern: One color and pattern in each room as selected by Design Professional from manufacturer's full range.
- D. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.
- E. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum or stainless steel at the intersection of the pilasters and the partitions.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
 - 1. Material: Chrome-plated zamac, Clear-anodized aluminum, or Stainless steel.
 - 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
 - 3. Latch and Keeper: Manufacturer's standard recessed surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
 - 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Coordinate this with all accessories, adjust location of Coat Hook as required.
 - 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
 - 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).
- C. Brass Castings: ASTM B 584.
- D. Brass Extrusions: ASTM B 455.
- E. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- F. Stainless-Steel Castings: ASTM A 743/A 743M.
- G. Zamac: ASTM B 86, commercial zinc-alloy die castings.

2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 30 inch wide, in-swinging doors for standard toilet compartments and 36 inch (914 mm) wide, out-swinging doors with a minimum **32 inch** (813 mm) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch (13 mm).
 - b. Panels and Walls: 1 inch (25 mm).
 - 2. Full-Height (Continuous) Brackets: Secure panels to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
 - 3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of

panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches (51 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 21 13

SECTION 10 28 00 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Public and private-use washroom accessories.
 - 2. Warm-air dryers.
 - 3. Custodial accessories.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

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.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

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

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, visible silver spoilage defects.
 2. Warranty Period: 15 years from date of Material Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Toilet Tissue (Jumbo-Roll) Dispenser **TBA-1**:

1. Basis-of-Design Product: Subject to compliance with requirements, provide **vonDrehle Corporation 3253** or comparable product by one of the following:
 - a. Marathon.
 - b. San Jamar.
2. Description: Twin Jumbo-roll dispense.
3. Mounting: Surface mounted.
4. Capacity: Up to 9 inch (228 mm) diameter rolls.
5. Material and Finish: ABS plastic.
6. Lockset: Theft resistant, special key furnished.

B. Toilet Tissue Dispenser **TBA-1A**:

1. Basis-of-Design Product: Subject to compliance with requirements, provide **Bobrick B-685** or comparable product by one of the following:
 - a. Marathon.
 - b. San Jamar.
2. Description: Toilet Tissue dispenser.
3. Mounting: Surface mounted.
4. Capacity: Up to 5 1/2 diameter rolls.
5. Material and Finish: Bright polished Stainless Steel.

C. Paper Towel Dispenser **TBA-2**:

1. Basis-of-Design Product: Subject to compliance with requirements, provide **Waussau OptiServ Roll Towel Dispenser Model No. 86800** or comparable product by one of the following:
 - a. American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.

- d. [GAMCO Specialty Accessories; a division of Bobrick.](#)
 2. Mounting: Surface mounted.
 3. Color: Black Translucent.
- D. Paper Towel **TBA-2B:**
1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-2860 or a comparable product by one of the following:
 - a. American Specialties, Inc.
 - b. Bradley Corporation.
 2. Description: Roll-paper towel dispenser.
 3. Mounting: Surface mounted.
 4. Capacity: 8-inch diameter roll.
 5. Material and Finish: Stainless steel, No. 4 finish (satin).
 6. Lockset: Tumbler type.
- E. Sanitary-Napkin Disposal Unit **TBA-3B:**
1. [Basis-of-Design Product:](#) Subject to compliance with requirements, provide [Bobrick Washroom Equipment, Inc.](#); **B-270** or a comparable product by one of the following:
 - a. [American Specialties, Inc.](#)
 - b. [Bradley Corporation.](#)
 - c. [GAMCO Specialty Accessories; a division of Bobrick.](#)
 2. Mounting: Surface mounted.
 3. Door or Cover: Self-closing, Top cover.
 4. Receptacle: Removable.
 5. Material and Finish: Stainless steel, No. 4 finish (satin).
 1. Provide 6 dozen disposable paper liners (Part No. 270-12) for this unit.
- F. Vendor **TBA-4:**
1. [Basis-of-Design Product:](#) Subject to compliance with requirements, provide [Bobrick Washroom Equipment, Inc.](#); **B-47069.25** or a comparable product by one of the following:
 - a. [AJW Architectural Products.](#)
 - b. [American Specialties, Inc.](#)
 - c. [Bradley Corporation.](#)
 - d. [GAMCO Specialty Accessories; a division of Bobrick.](#)
 2. Type: Sanitary napkin and tampon.
 3. Mounting: Surface mounted.
 4. Operation: Single coin (25 cents).
 5. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
 6. Lockset: Tumbler type with separate lock and key for coin box.
- G. Foam-Soap Dispenser **TBA-5:**
1. [Basis-of-Design Product:](#) Subject to compliance with requirements, provide **Matera Paper Co., Inc., Spartan Lite'n Foamy #SP-975600** or comparable product by one of the following:
 - a. Impact.
 - b. San Jamar.
 2. Description: Designed for dispensing soap in foam form.
 3. Mounting: Vertically oriented, surface mounted.

4. Capacity: 1000 mL
5. Closed System: Screw on cap pump/tank is replaceable; reservoir removable.
6. Materials: ABS Plastic, white finish.

H. Grab Bar **TBA-6:**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc.; **B-8606** series or a comparable product by one of the following:
 - a. American Specialties, Inc.
 - b. Bradley Corporation.
 - c. GAMCO Specialty Accessories; a division of Bobrick.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Outside Diameter: 1-1/2 inches (38 mm).
5. Configuration and Length: As indicated on Drawings.

I. Laminated Glass Mirror Unit **TBA-11:**

1. Basis-of-Design Product: Subject to compliance with requirements, provide ASI American Specialties Inc.; **B-6727** or a comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. Bradley Corporation.
 - c. GAMCO Specialty Accessories; a division of Bobrick.
 - d. Local fabricator as approved by the Architect.
2. Description: Laminated glass unit with 1/2-inch face stainless steel frame, in size(s) as indicated on the drawings.
3. Hangers: Security, concealed hangers, manufacturer's standard.

J. Robe Hook **TBA-16:**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc.; **B-6727** or a comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Double-prong unit.
3. Material and Finish: Stainless steel, No. 4 finish (satin).

K. Diaper-Changing Station **TBA-18:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc.
 - b. Diaper Deck & Company, Inc.
 - c. GAMCO Specialty Accessories; a division of Bobrick.
 - d. Koala Kare Products.
 - e. SafeStrap Company, Inc. (SSC, Inc.).

2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
 - a. Engineered to support minimum of **250-lb (113-kg)** static load when opened.
3. Mounting: Surface mounted, with unit projecting not more than **4 inches (100 mm)** from wall when closed.
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: HDPE in manufacturer's standard color.
6. Liner Dispenser: Built in.

2.3 WARM-AIR DRYERS

A. High-Speed Warm-Air Dryer **TBA-17**:

1. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Excel Dryer Inc.](#); **Xlerator Hand Dryer** or a comparable product by one of the following:
 - a. [American Dryer, Inc.](#)
 - b. [World Dryer Corporation.](#)
2. Description: High-speed, warm-air hand dryer for rapid hand drying.
3. Mounting: Surface mounted.
4. Operation: Electronic-sensor activated with operation with timed power cut-off switch.
5. Cover Material and Finish: Manufacturer's standard finish.
6. Electrical Requirements: 1500 W, 11-/120V, 12.5 Amp, 60 Ha.
7. Provide noise reducer nozzle.

2.4 CUSTODIAL ACCESSORIES

A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc. Basis of Design.
4. Bradley Corporation.

B. Mop and Broom Holder with Utility Shelf **TBA-20**:

1. **Basis-of-Design Product:** Subject to compliance with requirements:
 - a. [Bobrick Washroom Equipment, Inc.](#) B-239 x 36.
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf. Shelf to have exposed edges turned down not less than **1/2 inch (13 mm)** and supported by two triangular brackets welded to shelf underside.
3. Length: 34 - 36 inches.
4. Hooks: Four.
5. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, No. 4 finish (satin).
 - a. Shelf: Not less than nominal **0.05-inch- (1.3-mm-)** thick stainless steel.
 - b. Rod: Approximately **1/4-inch- (6-mm-)** diameter stainless steel.

2.5 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 15016/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

2.6 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 10 51 13 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Welded lockers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of metal locker.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.
- B. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Show locker trim and accessories.
 - 3. Include locker identification system and numbering sequence.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 - 2. Damage from deliberate destruction and vandalism is excluded.
 - 3. Warranty Period for Welded Metal Lockers: 10 years from date of Material Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers and accessories from single source from single locker manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

2.3 WELDED LOCKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AJW Architectural Products.
 - 2. DeBourgh Mfg. Co.
 - 3. List Industries Inc.
 - 4. Lyon Workspace Products, LLC.
 - 5. Olympus Lockers & Storage Products, Inc.
 - 6. Penco Products, Inc.
 - 7. Republic Storage Systems, LLC.
- B. Doors: One piece; fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.

1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches (381 mm) wide; welded to inner face of doors.
2. Door Style: Vented panel as follows:
 - a. Louvered Vents: No fewer than three louver openings at top and bottom for double-tier lockers.
- C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
 1. Tops, Bottoms, and Sides: 0.060-inch (1.52-mm) nominal thickness.
 2. Backs: 0.048-inch (1.21-mm) nominal thickness.
 3. Shelves: 0.060-inch (1.52-mm) nominal thickness, with double bend at front and single bend at sides and back.
- D. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
 1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees; self-closing.
 1. Hinges: Manufacturer's standard, steel, continuous or knuckle type.
- F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
 1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks or padlocks; positive automatic latching and prelocking.
 - a. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
- G. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- H. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
- I. Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
 1. Closures: Vertical-end type.
- J. Materials:
 1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- K. Finish: Baked enamel or powder coat.
 1. Color: As selected by Design Professional from manufacturer's full range.

2.4 FABRICATION

- A. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.
- B. Equipment: Provide each locker with an identification plate and the following equipment:
 - 1. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.
- C. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds flush.
- D. Accessible Lockers: Fabricate as follows:
 - 1. Locate bottom shelf no lower than 15 inches (381 mm) above the floor.
 - 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches (1219 mm) above the floor.
- E. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
 - 1. Sloping-top corner fillers, mitered.
- F. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

2.5 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.
 - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install lockers level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than **36 inches (910 mm)** o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
- B. Welded Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- C. Equipment:
 - 1. Attach hooks with at least two fasteners.
 - 2. Identification Plates:
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 - 1. Attach sloping-top units to metal lockers, with closures at exposed ends.
 - 2. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10 51 13

SECTION 10 73 26 - MANUFACTURED WALKWAY COVERS

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. This Section includes aluminum Post-and-beam supported and wall cantilevered walkway covers.

1.3 SYSTEM DESCRIPTION

- A. General: Provide a complete, integrated set of walkway cover manufacturer's standard mutually dependent components and assemblies that form a walkway cover system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water. Include primary and secondary framing, metal roof panels, and accessories complying with requirements indicated.
 - 1. Provide walkway cover system of size, spacings, slopes, configurations, and spans indicated.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide walkway covers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Design Loads: As indicated on Drawings.
 - 2. Live Loads: Include vertical loads induced by maintenance workers, materials, and equipment for roof live loads.
 - 3. Roof Snow Loads: As indicated.
 - 4. Deflection Limits: Engineer assemblies to withstand design loads with deflections no greater than the following:
 - a. Purlins and Rafters: Vertical deflection of 1/240 of the span.
 - b. Metal Roof Panels: Vertical deflection of 1/240 of the span.
- B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Seismic Performance: As indicated.
 - 3. Comply with ASCE 7.
- C. Thermal Movements: Provide walkway covers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for walkway covers.
 - 1. Include plans, elevations, and at least 3/4-inch scale sections of typical members and other components. Show anchors, reinforcement, accessories, layout, and installation details.

- a. Installation Drawings: Signed, dated, and sealed by a registered professional engineer licensed in jurisdiction in which the project is located.
- b. Show locations of electrical service connections.
- C. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Engineer shall be licensed in the State of Georgia.
 1. Detail fabrication and assembly of walkway cover systems.
 2. Include design calculations
 3. Design calculations shall state that the walkway cover system design complies with the wind requirements of ASCE 7.
- D. Samples for Verification: For each type of product indicated, of size below:
 1. Aluminum: For each form, finish, and color, on 6-inch- long sections of extrusions and squares of sheet at least 4 by 4 inches.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of walkway covering manufacturer for installation of units required for this Project.
- B. Source Limitations: Obtain walkway cover components through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of walkway covers.
 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.7 DELIVERY AND HANDLING

- A. Deliver walkway covers in protective covering and crating to protect components and surfaces against damage.

1.8 COORDINATION

- A. Coordinate installation of anchorages for walkway covers. Furnish setting drawings, templates, and directions for installing anchorages and other items that are to be embedded in concrete. Deliver such items to Project site in time for installation.
- B. Coordinate delivery time so walkway cover systems can be installed within 24 hours of receipt at Project site.

1.9 WARRANTY

- A. Warranty Period: Five years from date of Material Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Tennessee Valley Metals, or a comparable product by one of the following:
 1. Perfection Architectural Systems.

2. .
3. Mitchell Metals.

2.2 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of alloy 5005-H15.
- B. Aluminum Extrusions: Extruded Roof Deck, Cap, Fascia: Alloy 6061-T6, 6063-T5, and 6063-T6 as called for by profile and design.
 1. Thickness: As required by design, complying with minimum thickness requirement specified.
- C. Aluminum Sheet: For miscellaneous trim only: Alloy 3105-H28 or 3004-H34; Minimum yield: 30 ksi; Minimum thickness 0.040 inch.

2.3 ACCESSORIES

- A. Fasteners: Use concealed fasteners fabricated from metals that are noncorrosive to walkway cover systems material and mounting surface.
- B. Hardware:
 1. Fasteners: Plated non-corrosive Type 18-8 stainless steel, sealed with neoprene "O" rings beneath flat washers.
- C. Anchors and Inserts: Use stainless steel or hot-dip galvanized anchors and inserts. Use torque-controlled expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete.
- D. Provide Manufacturer's standard escutcheons at locations where struts penetrate finished wall surfaces.
- E. Provide aluminum overhead support rods, finish to match canopy at locations of overhead supported covers.
- F. Concrete for Foundations: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 2500 psi, unless otherwise indicated.

2.4 FABRICATION, GENERAL

- A. General: Provide walkway cover systems consisting of extruded aluminum canopy supported on foundation-mounted, aluminum structural framing system and canopies attached to walls and supported by struts as indicated.
 1. Provide walkway cover support columns as indicated on the drawings.
 2. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side.
 3. Mill joints to a tight, hairline fit. Form joints exposed to weather to exclude water penetration.
 4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.
 - a. Exposed fasteners will not be permitted in walkway columns.

2.5 STRUCTURE

- A. Support: Provide walkway covers with components consisting of channels, angles, plates, or other fittings. Drill holes in members for anchor-bolt connection.
 1. Provide anchor bolts of size required for connecting to walls.

2.6 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. High-Performance Organic Coating Finish (Fluoropolymer Two-Coat System): Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color, with color coat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions and AAMA 2605.
 - 1. Color and Gloss: As selected from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify all dimensions existing and provided.
- B. Make reasonable adjustments in fabrication and erection to provide an acceptable finished walkway cover.

3.2 INSTALLATION

- A. Walkway cover system to be installed by manufacturer, or manufacturer's authorized installer.
- B. Excavation: In firm, undisturbed or compacted soil, excavate walkway cover systems foundation to dimensions indicated.
- C. Set anchor bolts and other embedded items required for installation of walkway cover systems. Use templates furnished by suppliers of items to be attached.
- D. Install walkway cover systems level, plumb, and at height and slope indicated, with surfaces free from distortion or other defects in appearance.
 - 1. Roof Panels:
 - a. Fabricate roof panels to required lengths.
 - b. Install level and square to beams to avoid "out of square" conditions at beam ends.
 - c. Secure each contact point with a minimum of three stainless steel fasteners with 3/4 inch (19 mm) flat neoprene washers.
 - 2. Joints Sealants and Flashing:
 - a. Seal fabrication joints and seams away from view where required.
 - b. Seal all other points where water penetration might be expected.
 - c. Flash connection to walls where walkway cover units contact surface of building: do not use sealant.
 - 3. Coordinate installation of struts and escutcheons with other trades.

3.3 CLEANING

- A. At completion of installation, clean soiled surfaces of walkway cover systems according to manufacturer's written instructions.
 - 1. Remove protective film from members. Clean canopy of dirt, grease, handprints, and other blemishes. Leave area in a neat, clean, and acceptable condition.
- B. Protect canopy from damage from other construction operations. Provide temporary barricades where necessary.

END OF SECTION 10 73 26

SECTION 11 31 00 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cleaning appliances.
- B. Related Requirements:
 - 1. 26 20 20 "Wiring Devices" for recessed clock-type outlets for microwave ovens.
 - 2. Division 22 00 00 Plumbing.
 - 3. Division 26 00 00 Electrical.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of appliance.
- B. Sample Warranties: For manufacturers' special warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.5 WARRANTY

- A. Special Warranties: Manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period except as qualified below:
 - 1. Warranty Period: One year from date of Material Completion.
- B. Clothes Washer: Full warranty, including parts and labor, for on-site service on the product.
 - 1. Warranty Period: One year from date of Material Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of residential appliance from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Appliances: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 CLOTHES WASHER/DRYER COMBINATIONS

- A. Clothes Washer/Dryer Combination **WD**: Complying with AHAM HLW-1.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide General Electric Company (GE Appliances); **GD27EESNWW**. or a comparable product by one of the following:
 - a. Fisher & Paykel Appliances Limited.
 - b. LG Electronics.
 - 2. Type: Freestanding washer/dryer.
 - 3. Energy Star Qualified.
 - 4. Dimensions:
 - a. Width: 27 inches.
 - b. Depth: 30 7/8 inches.
 - c. Height: 75 7/8 inches.
 - 5. Washer and Dryer Drums: Manufacturer's standard.
 - a. Washer-Drum Capacity: 3.9 cu. ft.
 - b. Dryer-Drum Capacity: 5.9 cu. ft.
 - 6. Washer Controls: Rotary-Electronic controls for water-fill levels, wash/rinse water temperatures, and variable-speed and fabric selectors.
 - 7. Dryer Controls: Rotary-dial controls for drying cycle, temperatures, and fabric selectors.
 - a. Wash Cycles: 11 wash cycles, including regular, delicate, and permanent press.
 - b. Wash Temperatures: Six settings.
 - c. Speed Combinations: One.
 - 8. Electric Washer/Dryer Power: 120/208 V, 60 Hz, 1 phase, 12 A.
 - 9. Motor: Manufacturer's standard with built-in overload protector.
 - 10. Washing Features:
 - a. Stainless steel tub.
 - 11. Drying Features:
 - a. End-of-cycle signal.
 - b. 56 ft. long venting capacity with no elbows.
 - 12. Appliance Finish: Enamel.
 - a. Color: White.

2.4 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install appliances according to manufacturer's written instructions.
- B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
 - 2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After installation, start units to confirm proper operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
- B. An appliance will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

END OF SECTION 11 31 00

SECTION 11 40 00 - FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All work included under this Section is subject to Architect's provisions covering: Invitation to Bid, Proposal Form, Instructions to Bidders, General Conditions, and all other Supplementary General Conditions as may be added.

1.2 SCOPE OF WORK

- A. All specified equipment to be delivered to the job site, freight prepaid, uncrated, assembled, and set in place, ready for final connections, where required, as specified in Divisions 22 00 00 and 26 00 00 of Performance Criteria.
- B. Related Sections include the following:
 - 1. Division 22 00 00/23 00 00 – Mechanical/HVAC
 - a. Provide all water lines, drains, and other necessary work, including final connections to equipment.
 - b. Provide all ducts to exhaust and supply fans to those hood(s) specified in this Section of Performance Criteria.
 - c. Provide all faucets, special switches, valves, traps, labor, and materials to make final connections to the equipment unless specified in this Section.
 - 2. Division 26 0000 - Electrical
 - a. Provide all electrical utility lines, disconnect switches, and other work, including final connections to equipment.

1.3 DESCRIPTION

- A. The extent of the Food Service Equipment is on the Drawings, Equipment Schedule, and Specifications of this Section of Performance Criteria. Each model number includes the code *C013 as a suffix. This code is known as the Specifier Identification System. It is not to be removed by the bidders. Its purpose is to identify the specifier to the vendors providing the equipment when it is necessary to communicate questions, clarifications, and comments from before the bid award through the final purchase. It is to be used on all correspondence, including fax and e-mail, when communicating with manufacturer representatives and factories.
- B. The plans indicate the location of the equipment. Slight changes due to the varying dimensions of equipment and wall construction shall be permitted with approval by the Architect.
- C. These typed Specifications shall be closely correlated with the Drawings and Schedule. Each complements the other, and cross-reference shall be necessary to fulfill the requirements of these Specifications. All information shown on Drawings and listed in Schedules are to be as part of the written Specifications.
- D. Conflict in Plans and Specifications where changes, alterations, additions, or deductions are necessary, or where exceptions are concerning sizes, locations, and other details shown on plans, shall be reported in writing for a decision by the Architect.
- E. The Contractor shall be responsible for seeing that the equipment can be entered through openings before doors and walls are finished.

1.4 WORK BY OTHERS

- A. All Plumbing, Electrical, and Ventilation Work required in connection with this Section shall be done by the other Contractor unless specifically called for in the itemized Equipment Specifications. Work of others shall include but not be limited to exhaust fans and ductwork associated with the ventilation of hood, roughing-in to points indicated on the mechanical, plumbing, electrical plans, and final connections from rough-in locations to various pieces equipment requiring such connections and the supplying of all necessary materials and labor for this work except as specified or scheduled.
- B. Tile bases, below the various item, is equipment shall be provided by others.
- C. Refrigeration Work to be performed under this Section, except for electrical and plumbing connection to compressors, blower coils controls, etc., provided by others, is as listed in the itemized specifications.
- D. All line and disconnect switches, safety cut-outs, control panels, fuse boxes, or other electrical controls, fittings, and connections shall be furnished and installed by others. Starting switches shall be provided by Food Service Equipment Supplier as specified under General Specifications. Those starting switches furnished loose as standardized by Food Service Equipment Supplier manufacturers (other than fabricated items) shall be installed and connected by others.
- E. Any sleeves or conduit required for refrigeration and tubing lines shall be furnished and installed by others. Refrigeration alarm system connection by others.
- F. Plumbing Trades shall confirm that all lines are flushed free of foreign matter before connecting equipment.
- G. The electrical sub-contractor shall make all final connections to the equipment shown on Drawings or specified, and it shall be the responsibility of the electrical sub-contractor to check all equipment to determine where starters, contractors, switches, and other items are required.
- H. The plumbing sub-contractor shall make all final connections to the equipment shown on Drawings or specified, and it shall be the responsibility of the plumbing sub-contractor to provide traps, tailpieces, and fittings, water piping, floor drains, shut off valves and all other necessary fittings. The Food Equipment Supplier shall provide faucets and all lever waste drains, hose reels with mixing valves to the plumbing subcontractor for connection and installation.
- I. The mechanical sub-contractor shall make final connections to the equipment shown on Drawings or specified, and it shall be the responsibility of the mechanical sub-contractor to provide and install necessary ventilation facilities of sufficient capacity to operate the equipment. Mechanical work to be done by the Food Service Equipment Supplier is listed in the itemized equipment specifications.
- J. The General Contractor shall provide openings and passageways of sufficient to sustain the weight of the Food Service Equipment Supplier, and he shall provide openings and passageways of sufficient size to permit the delivery and erection of the equipment to their respective locations without dismantling. Coordination of these openings is critical for the equipment installation. The General Contractor shall provide a depressed floor for drains grates and walk-in cooler/freezer when noted.

1.5 QUALITY ASSURANCE

- A. The equipment furnished under this Section to be supplied by one Kitchen Equipment Company.

- B. Permits and Certificates:
 - 1. All laws, codes, ordinances, and regulations bearing on the conduct of the work as drawn and specified shall be complied with and give all notices required. Any work upon which an inspection certificate by local authorities or any governing body is required, such as Inspection Certificate or Certificates shall be obtained and paid.
- C. Certificates of acceptance or completion as required and issued by the State, Municipal, or other authorities shall be procured and delivered to the Owners. The Owners may withhold payments which are due or which may become due until the necessary Certificates are obtained and delivered to Owners.
- D. All safety devices and all accessories required to comply with regulations and governing codes shall be provided, regardless of whether or not specified or called for in the following technical divisions of the equipment list portion of this Section of Specifications.
- E. Applicable Manufacturing Standards:
 - 1. Special fabrication items shall be manufactured in compliance with Standard No. 2 of the National Sanitation Foundation Testing Laboratory and shall bear the NSF Seal of Approval.
- F. Equipment pieces shall be manufactured in compliance with Standards No. 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 37, 51, 59, and 61, where applicable, of NSF Testing Laboratories and bear the Seal of Approval. This shall include any pending standards, which shall become applicable at the time equipment is delivered.
- G. Electrical Equipment shall conform to the standards of the National Electrical Manufacturers Association (NEMA). Equipment shall have conveniently located control switches, enclosed case type, comply with State of Georgia Electric Code, and bear the label from an approved Testing Laboratory. (UL or ETL)
- H. Electrically heated and motor-driven fixtures shall be for the current shown in the Mechanical and Electrical plans. These items of equipment shall have mounted motor starters, switches, and controls. All shall be required for each fixture or complete Section of a fixture, or as specified.
- I. NFPA Codes 13, 17, 17A, and 96 standards shall be complied with for the exhaust system. Provide all safety devices on all accessories required to comply with regulation and governing codes.
- J. Miscellaneous Requirements:
 - 1. Plumbing:
 - a. Provide chrome-plated faucets specified certified to NSF standard 61, Section 9. All backsplash-mounted faucets shall be provided with double male nipples having locknuts for rigidly securing the faucet to the backsplash. Nipple-locknut assembly shall be provided under this Section as part of the faucet.
 - b. Provide all wastes incorporated in the custom-built fabricated Food Service Equipment. Provide all wastes with a chrome-plated tailpiece.
 - 2. Electrical:
 - a. Interwiring of Food Service Equipment between heating elements, switches, starters, thermostats, outlets, motors, and solenoids shall be complete to the junction box, terminal box, or disconnect switch (should Specifications call for disconnect switch to be provided in this Section).
 - b. Provide grounded receptacles specified under Item No. of detail Specifications or as shown on the Contract Drawings. All receptacles to be as specified and furnished with stainless steel faceplate.
 - c. All electrically operated equipment to be per the codes, regulations, and the laws of the State of Georgia.

3. Safety:
 - a. All Food Service Equipment provided under this Contract shall be manufactured and installed in conformance with the Williams-Steiger Occupational Safety Health Act of 1970.
4. Coordination:
 - a. Coordinate with Project's plumbers and electricians to assist in cutting or knocking out holes in the stainless steel tables, counters, and cabinet bases to allow for efficient utility connections to equipment.

- K. The Contractor shall be held responsible and liable for all changes or variances from Performance Criteria without written authorization from Architect for said changes or variations.

1.6 REFERENCES

- A. The Drawings indicate the desired basic arrangement and dimensions of the equipment. Minor deviations may be substituted for approval provided basic requirements are met, and no significant rearrangement of service to the equipment is required to affect the proposed alteration. These deviations shall be made without expense to the Owner.
- B. Operational and functional tests of the installed equipment are required. Defects or deficiencies shall be corrected to the satisfaction of the Architect or Owners at the expense of the Contractor. Consult the Mechanical and Electrical Connections Drawings and they're accompanying Specifications to determine additional requirements of the work and shall cooperate with all trades to ensure a satisfactory installation.
- C. The electrical wiring of motors, motor starters, switches, and thermostats of the equipment shall be an integral part of the unit, which shall contain a junction box for the connection of electrical service. All motor-driven equipment shall have thermal overload and underload protection.
- D. Furnish on each motor-driven appliance or electrically heated unit; a suitable mounted control switch or starter of proper type per UL or ETL Codes. All controls mounted on vertical surfaces of fixtures shall be set into recessed die-stamped stainless steel cups or otherwise indented to prevent damage to the control switch.

1.7 SUBMITTALS

- A. Refer to Division 01 requirements for Submittals
- B. FSEC shall verify all field measurements on the job site to ensure proper fitting of all equipment. Within four (4) weeks after award of the Contract, FSEC is to electronically submit PDF format to the Architect, for tentative approval, all dimensioned rough-in drawings, equipment submittal brochures, fabrication, and Manufacturer's shop drawings.
 1. Partial submittals will not be accepted and will be stamped Revise / Resubmit. The reproduction of original contract documents is not acceptable for use as a submittal.
- C. After the initial review of submittal data, revise and resubmit only the datasheet, coversheets, or rough-in and shop drawings that have been modified or changed. The entire submittal is not required for a resubmission. After two resubmissions, the FSEC may be charged a fee for Camacho's continuous re-evaluation. This will be billed as an additional service.
- D. Field Measurements
 1. Measurements required to size and place Food Service Equipment are to be verified with on-site field dimensions. Do not rely on or measure drawings for actual on-site dimensions. Dimensions shall be taken from the actual structure, giving given due consideration to any

architectural, structural, or mechanical discrepancies that may occur during construction of the building. Field dimensions shall be taken at the earliest opportunity so as not to delay deliveries. Notify FoodService Consultant of the earliest date and time. FSEC shall be responsible for the proper fit of all equipment furnished under this Section of the Contract. Gaps over 1/4" wide are not acceptable.

E. Rough-In Drawings:

1. Prepare and submit rough-in drawings showing all utility rough-ins for kitchen equipment items, including items listed as "Future, Existing-Relocate, or Owner Furnished" (min. scale of 1/4" = 1' -0"). Drawings to indicate the size and location of all utilities, floor depressions, raised bases, and wall openings for equipment. The item numbers shown on the rough-in drawings shall be the same as shown on contract documents. Drawings shall be dimensioned to the stub up or stub out, not to the connection on the equipment. FSEC shall be responsible for conforming to these conditions with equipment and connections thereto. In the event rough-in has been completed before the award of the Contract, the FSEC shall thoroughly investigate and field verify the provided rough-in locations and provide equipment to suit building conditions.
2. Provide equipment floor plan with itemized equipment, to include all utility loads.
3. Electrical rough-in plans are to be dimensioned to indicate the above-finished floor (AFF) height. 90° plug heads where available. Verify all NEMA plug types, length of cords, equipment connections lengths. Lengths are to be of adequate distance for outlets available and to allow equipment to be placed as shown on contract documents. Show convivence receptacle location.
4. Plumbing rough-in plans are to be dimensioned to indicate the above-finished floor (AFF) height.
5. Ventilation rough-in plans are to be dimensioned.
6. Special conditions plan indicating dimensions and locations of:
 - a. Wall openings for pass-through equipment.
 - b. Floor drains.
 - c. Wall backing.
 - d. Recessed or wall-mounted control panels
7. Provide a refrigeration system schematic piping plan indicating line size, elevation, trap locations, and all specified components required for the refrigeration system installation. The plan is to include equipment and parts provided by the Refrigeration Equipment Manufacturer. Verify refrigeration sizing is proper for line lengths determined by actual field conditions.

F. Equipment Cut Sheets:

1. The following instructions for Rough-In and Equipment submittal are in addition to any requirements given elsewhere in the Documents.
2. Prepare and submit equipment cut sheets showing all Manufacturer's data sheets describing equipment as specified. Include items listed as "Future, Existing-Relocate, or Owner Furnished." The item numbers shown on the submittal shall be the same as shown on contract documents. The equipment cut sheets are to be provided using Auto Quotes format or similar, including coversheets for each item. Where a piece of equipment is used and specified with multiple item numbers assigned, the first item is to be provided with a cover sheet and datasheet. For additional identical items, provide cover sheets only. Provide the following information on the coversheets:
 - a. Project name.
 - b. FSEC name.
 - c. Foodservice Consultant name.
 - d. Item Number.
 - e. Equipment description.

- f. Quantity.
- g. Written specification/description of equipment provided.
- h. Accessories.
- i. Utilities.

G. Shop Drawings

1. Custom stainless steel equipment, walk-in cooler/freezer and refrigeration, dishwashers, scullery equipment, and other shop drawings shall be provided on similar size drawing sheets as contract documents. All shop drawings shall be detailed and fully dimensioned to a minimum scale of $\frac{3}{4}'' = 1' - 0''$. Elevations and sections to be detailed to a minimum scale of $1 - \frac{1}{2}'' = 1' - 0''$. Show all materials, gauges, and methods of construction, including relation to adjoining and related work when cutting or close-fitting is required. Show all reinforcements, wall plates, and backing, anchorage, needed other work needed for a complete installation of fixtures. Drawings to show item number and quantity required for each detail. Omissions and discrepancies on approved drawings shall not relieve the FSEC of providing items as specified and shown on contract drawings.
2. Show adjacent walls, columns, and identify countertop equipment showing item numbers and descriptions.
3. Show all components that are included in fabricated equipment.
4. For equipment with load centers (panels), indicate total electrical calculations, including circuits. Provide an electrical diagram for on-site electricians.
5. Provide color, pattern, or finishes for laminated, fiberglass, paint, or stain for approval by the Architect/Owner.

- H. Verify size and weight information of the service ware (glasses, plates, trays, cups, etc.) for self – leveling dispensing, ware washing, and mobile equipment with the Owner. Verify carts, racks, and dollies can fit into fixed equipment (roll-in refrigeration, combi ovens, walk-ins, counters, etc.)

1.8 HANDLING AND STORAGE

- A. Protect metal and millwork product finishes from damage during shipping, storage, handling, installation, and construction of other work in the same spaces. Wrap and crate each item of equipment as needed for protection from damage.
- B. Cover exposed stainless steel surfaces and millwork surfaces with self-adhesive protective paper of a type recommended by the metal and millwork manufacturer, and do not remove until work is installed and ready for cleaning and start-up.

1.9 SCHEDULING

- A. Schedules and Reports:
 1. Establish earliest and latest job site delivery dates of FSES provided equipment.
- B. Delivery of Owner furnished equipment for installation shall take place at a time to be determined by Owners, but not necessarily during regular working hours.

1.10 SUBSTITUTION

- A. Substitution of Materials and Equipment:
 1. Whenever a material, article, or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade name, catalog numbers, or the like, it is so identified to establish a standard. Any material, article, or piece of equipment of other manufacturers or vendors which shall perform adequately the

duties imposed by the general design, shall be considered equally acceptable provided, in the opinion of the Architect, it is of comparable substance, construction, appearance, and function. It shall not be purchased or installed without Architect's written approval. Substitute items shall be submitted to Architect at least ten days before the bid date for review and consideration. Acceptable items shall be so stated in an Addendum.

1.11 WARRANTY

- A. Workmanship and Guarantees:
 - 1. Equipment shall be delivered in an undamaged condition upon completion. All workmanship and labor shall be of the best in their respective fields and skilled mechanics of the trades involved.
- B. All equipment, as specified in this Section, shall be guaranteed for one year from the time of substantial completion. If, at any time within this warranty period of one year, any equipment that is found to be faulty due to poor workmanship, inferior or defective materials, replace said pieces or correct each defective part at no cost to Owners.
 - 1. Refrigerated items shall have an additional four-year warranty on the compressor unit. On extended compressor warranty, only labor charges after the first year shall be paid.
- C. At the end of the first year, assign extended warranties to Owners on equipment having more than one year warranty from Manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless steel shall be austenitic steel alloy and must meet the requirements of the American Iron and Steel Institute Designations for Type 201 and Type 304 Stainless steel. Type 430 Stainless steel (straight chrome - no nickel) shall not be acceptable for custom-built fabricated equipment.
- B. All sheets shall have genuine mill finish of not less than commercial No. 4 on the exposed side and with not less than No. 2 on the unexposed side. All stainless steel shall be stretcher leveled, with a thickness of:
 - 1. 14 Gauge - Not less than 0.075 Inch
 - 2. 16 Gauge - Not less than 0.063 Inch
 - 3. 18 Gauge - Not less than 0.050 Inch
 - 4. 20 Gauge - Not less than 0.038 Inch
- C. Welding shall be of electric arc or oxy-acetylene gas. Welding shall be done with a rod of the same material and full penetration in the entire length of the joint. Welds to be flat without buckles, voids or imperfections. All welds shall be ground flush with adjacent surfaces, conditioned to eliminate slippery surfaces. All shear cuts or bends that tend to open the surface of the metal shall be rewelded, ground, and polished. All edges are to be ground and filed to eliminate sharp or rough edges.
- D. When stainless steel sheets have the grain running in different directions, the sheets shall be so jointed, and welds run and finished in such a manner as to make the sheets appear as one continuous product.
- E. Gauges:
 - 1. All Gauges of metals, where specified, shall be manufactured to the standards set forth by

- the US. Standard for Sheet Metal.
2. Unless specified, no material shall be finished lighter than 20 gauge for custom-built fabricated equipment.

F. Sound-Deadening:

1. The undersides of dish tables shall be sound-deadened to no less than 1/8 inch thick and allowed to dry thoroughly before being finished with two coats of paint.

2.2 FABRICATION

- A. Products manufactured by Atlanta Custom Fabricator, Low Temp, and Advance Tabco, modified to comply with specifications, are acceptable.

B. Metal Tops for Tables:

1. Shall be constructed of 14 gauge stainless steel with butt joints welded, ground, and polished smooth, resulting in a one-piece top without joints and crevices. Tops are to be reinforced using 14 gauge stainless steel channel irons, 1 inch by 5 inches by 1 inch. Securely fastened to the underside, on 30-inch centers, by studs or welding in a vermin-proof manner. Freestanding ends are to be turned down 1-3/4 inch on bull-nose edge, or 2-inch rolled down the edge with all exposed corners rounded on a 2-1/2 inch radius, or bull-nose corner. Where the table borders on or is adjacent to the wall, there is to be a 4-inch high backsplash with a 1-inch turn back to the wall with welded enclosed ends, unless otherwise specified. See Drawings for typical tabletop details. Reference Sheet Title K701; Foodservice Standard Details.
2. Sleeves:
 - a. Where legs, standards, pipes, or pipe chases come through a work area or tabletop, they shall pass through 3-inch high stainless steel sleeves, with the periphery fully welded and polished to match adjacent surfaces.

C. Sinks:

1. Shall be constructed of 14 gauge stainless steel sheets with all interior corners rounded on at least a 1/2 inch radius. All bottom corners shall be fully coved. All joints to be welded, ground, polished, and made to match adjacent surfaces. Provide each sink with a 2-inch chromium-plated waste outlet with a stainless steel strainer and Chromium Plated tailpiece. Provide with a rotary lever handle waste valve. Wastes are to be depressed in sink bottoms with bottoms inclining down towards the wastes. Waste for pot sink shall be rotary Model No. B-3940-01, T & S Brass; chrome draining, flat strainer with overflow. Wastes for prep sinks shall be rotary Model No. B-3940, T & S Brass, chrome draining or approved Model by Component Hardware Group, Inc and T & S Brass and Bronze Works. The rotary handle shall have front stainless steel bracket support welded to the underside of the sink compartment. Backsplash against wall shall be eight inches high with two-inch turned back on 45-degree angles with enclosed welded ends. Support sinks on legs and gussets, as specified, with braces from front to rear only. See Drawings for backsplash typical details.
2. All backsplashes against the wall shall be sealed with clear Polysulphide Sealant.
3. Each compartment shall have a cut-out on the rear to accommodate overflow assembly provided with drain assembly. Overflow and drain assemblies shall be installed and made watertight.

D. Insert Sinks:

1. Shall be sized and shaped as specified with the same construction as required for other sinks except that no backsplash is required. The sinks are to be welded into tabletops. All welds are to be ground and polished smooth. Provide with wastes as specified for sinks.

- E. Drain Tables and Drain Boards:
 - 1. Shall be constructed of 14 gauge stainless steel, size, and shape as specified. They are to be made integral with sinks. The front and free ends are to be constructed with a minimum of 3 inches high 1-1/4 inch to 1-1/2 inch rolled rim on a 180-degree turn, unless otherwise specified. Backsplash shall be the same height as for sinks, same construction, and integrally welded with sink. Construct drain tables or boards to allow liquids to drain into sinks.

- F. Undershelves:
 - 1. Undershelves are to be constructed in sections of 18 gauge stainless steel and notched out to fit around legs and be fixed type. Intermediate shelves are to be constructed of 18 gauge stainless steel and be fixed type construction unless otherwise specified.

- G. Overshelves:
 - 1. Overshelves shall be fabricated of 16 gauge stainless steel with edges rolled down or up and supported as specified.
 - 2. Overshelves mounted on tabletops shall be supported by 16 gauge stainless steel tubular legs. Legs are to be securely fastened to the tabletop with fasteners similar to Model No. 1655000272, manufactured by Kason Food Service or approved Manufacturer.

- H. Wall Shelves:
 - 1. Wall Shelves shall be fabricated of 16 gauge stainless steel and same construction as "Overshelves." Secure brackets to the wall with stainless steel screws with expansion shields. Brackets shall be spaced on a maximum of 4 feet on center.
 - 2. Cantilevered Wall shelves shall be supported on the table's extended rear legs with cantilevered supports of 14 gauge stainless steel flag brackets.

- I. Drawers:
 - 1. Lift out type drawer body, one-piece twenty inches by twenty inches by five inches deep, unless otherwise specified. Drawer pan stamped of 20 gauge stainless steel with inside radiused corners. Construct drawer face of double-wall stainless steel, 16 gauge exterior, and 20 gauge interior with integral horizontal pull. Fill the void in the drawer front with sound deadening material. Mount drawer pan in 18 gauge stainless steel cradle with roller bearing slides with stops. When fully extended, the drawer to support a minimum 200 pounds. Enclose drawer in 18 gauge stainless steel housing on sides and rear. Design pan carrier to be full opening without tilting. Provide with manually operated release latches to allow drawer removal. Drawer assemblies shall be a positive self-closing type.

- J. Legs, Braces, Gussets, Feet:
 - 1. The height of tables and other fabricated items of equipment shall be as specified. Legs shall be of 1-5/8 inch outside diameter, stainless steel 16 gauge tube spaced at intervals of 60".
 - 2. Legs are to be braced by 1-5/8 inch outside diameter stainless steel 16 gauge tube undershelf, welded to legs., 10 inches above the floor. Weld all around the periphery at the joint to legs and grind smooth. The braces shall be constructed to form rectangular, or "H" frames, and there shall be at least one brace welded to each leg.
 - 3. Gussets shall be stainless steel NSF approved, cylindrical type with a setscrew. Leg gussets are to be welded to the underside of tables, to reinforcing channels, and underside of sinks. Gussets shall be Model No. A20-0206 manufactured by Component Hardware Group Inc. or comparable stainless steel gussets manufactured by Standard-Keil Hardware Manufacturing Company, United Showcase, Component Hardware, and Kason Food Service.
 - 4. Feet shall be stainless steel adjustable bullet shape, fully enclosed, tightly fitting the leg.

Provide 1 inch up and down adjustment from the central position, at no time exposing any threads. Adjustments are to be easily made by hand without the use of tools. For counters and cabinet bases, the feet shall be the same as for above. Feet having the comparable quality to Component Hardware Group, Inc. and Kason Food Service are approved. Legs for cabinet base shall be 8 inches high, including feet. Freestanding sinks shall be supported on legs and feet as specified, with bracing from front to rear only.

5. Where flanged feet are specified, provide stainless steel flanged feet, which can be securely fastened to the floor.

K. Casters:

1. Plate Type: Provide stainless steel swivel plate casters. Provide with 5-inch Ply-Loc gray wheels with 1-1/4" tread, zerk grease fittings, and seals and a 250-pound capacity. Front casters to have brakes, manufactured by Component Hardware Model No. CMPI-5RPB or equal manufactured by Jarvis Casters or Colson Caster.
2. Stem Type: Plate Type: Provide stainless steel swivel plate casters. Provide with 5-inch Ply-Loc gray wheels with 1-1/4" "tread, zerk grease fittings, and seals and a 250-pound capacity. Front casters to have brakes, manufactured by Component Hardware Model No. CM54-5RPB or equal manufactured by Jarvis Casters or Colson Caster.

L. Rough Edges:

1. All ends and edges which are rough or sharp shall be filed and ground to a safe, smooth finish before delivery to the job site.

2.3 MISCELLANEOUS ACCESSORIES

A. Water Filters:

1. Provide water filters for all ice-making, hot and cold beverage equipment, and all steam boilers. All filter units are to be provided with shut-off valves and quick change filters.
2. FSEC to ensure water supply is comprehensively tested and that water filter specified effectively treats water to within manufacturer's water standards.

B. Stainless Steel Ceiling Panels:

1. Type I exhaust hoods to be installed with a clearance to combustibles of not less than 18 inches. Foodservice Equipment Contractor to provide 20 gauge stainless steel wall and ceiling panels, extending 18 inches in all directions from Exhaust Hood, Item Number 63 & 118 Panels to be 304 series stainless steel with No. 3 finish.
2. Wall panels to be 48" wide with vertical grain. Where all vertical panel joints occur, provide stainless steel trim strip with hidden fasteners. All panels to be sealed to wall with clear polysulfide sealant and held in place at edges w/ stainless steel screws. Provide bottom horizontal edge of panel with a 1" @ 45 degree bend to overlap the floor cove base.
3. Verify ceiling panel sizes from architect's reflected ceiling plan.

C. Stainless Steel Enclosures:

1. Provide 20 gauge stainless steel trim to fill in wall openings at Pass-Thru Cabinets. Trim will overlap the wall by approximately 2 inches and be within 1/2 inch of cabinets on the side. Provide for a 3 inch opening between the top of the Cabinet and wall.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND INSTRUCTION MANUALS

- A. At a time as designated by the Architect or Owners, demonstrate the operation, care, and minor maintenance of the equipment supplied. Supply the Architect with an affidavit signed by the

Owners or Food Service Manager/Director that this service was rendered and performed.

- B. At the start of the operation, devote one full working day to monitoring all equipment operations. The purpose of this day is to ensure equipment is in proper working order at the start.
- C. Coordinate start-up of equipment with testing and balancing of HVAC system. Ensure that the HVAC will be operating correctly, even during maximum equipment use.
- D. Copies to be submitted before the final punch list. Submit to Owners at time of demonstrations two digital copies (flash drive, CD, or alternate digital device) containing:
 - 1. Instructions.
 - 2. Warranties.
 - 3. Parts list of all bought-out items provided under this Section.
 - 4. List of names, addresses, and telephone numbers of local authorized servicing agencies.
 - 5. The videos are to show and detail the proper care and maintenance of equipment.

3.2 FIELD MEASUREMENTS

- A. Field measurements shall be made, giving due consideration to any Architectural, Mechanical, or Structural discrepancies which may occur during the construction of the building. No extra compensation shall be allowed for any difference between actual dimensions secured at the job site and the measurements indicated on the Contract Drawings.
- B. Any differences that may be found during field measurements shall be submitted to the Architect for consideration before proceeding with the fabrication or supplying of any equipment.

3.3 INSTALLATION

- A. Dispose of all packaging and debris per Construction Waste Management Plan.
- B. Make arrangements for receiving equipment and make delivery into the building. Do not consign any equipment to the Owners or any other Contractor unless written acceptance from them and satisfactory arrangements have been made for the payment of freight and all handling charges.
- C. Deliver all equipment into the building, uncrate, assemble, level and repair any damaged or abraded surfaces. Set equipment temporarily in its final locations, permitting the mechanical and electrical trades to take the necessary measures for the connection of the service lines; then move the equipment sufficiently to allow the installation of such service lines. After which realign equipment level and plumb, making the final erection as shown on the Contract Drawings. All equipment shall be installed so as to eliminate objectionable vibration.
- D. The Contractor shall have a competent Food Service Equipment foreman on the premises to assist in furnishing information and supervising the installation of Food Service Equipment under this Section. This foreman shall verify the correct locations for Rough-Ins.

3.4 LUBRICATION - OIL AND GREASE

- A. Each moving part in the entire food facility installation shall be provided with suitable bearings with provision for greasing or with grease gun connections suited to a high-pressure gun for distributing heavy oil or light grease. Points of lubrication shall be readily accessible.

3.5 KITCHEN EQUIPMENT

- A. It is the responsibility of the foodservice equipment dealer to ensure that any products by manufacturers listed as being acceptable to the original specification meet the design and

performance specifications of the prime specification in every way.

- B. The intent of the prime specification is to set forth the level of quality and features/options that are desired by the Owner. All features and options of the prime specification must be included with and product substituted from the list of approved manufacturers.
- C. Reference Kitchen Floor Plan for the location of equipment. Obtain equipment of like families through the same Manufacturer.
 - 1. FLY FAN
 - a. Berner Model No. SHD07-1048A*C013
 - b. Fly Fan, 48" long, unheated, (1) 3/4 hp motor, aluminum housing with white finish, indoor or exterior mounting, cULus, UL EPH Classified.
 - c. Provide unit with the following:
 - 1) 9503SD020-P Automatic Door Switch, plunger type, activates air door when the door opens, single-phase only & max. Amp draw of 20 amps. Reference Sheet Title K703; Foodservice Standard Details.
 - d. Products manufactured by Mars and Astral Air, modified to comply with specifications, are acceptable.
 - 2. WORKTABLE
 - a. Atlanta Custom Fabricator
 - b. Provide fabricated stainless steel WorkTable, size, and shape, as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
 - c. Provide table w/ 4" backsplash and rolled edge on front and right end.
 - d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
 - 3. DRY STORAGE SHELVING
 - a. Cambro Model No. ESU SERIES *C013
 - b. Starter Unit, 21" W x 48" L x 84" H, 5-tier, withstands temperature from -36°F (-38°C) to 190°F (88°C), includes: (5) vented reinforced polypropylene shelf plates with Camguard® antimicrobial protection, (4) composite posts with leveling feet installed, pre-assembled post connectors & wedges, (10) stationary traverses & (5) bags of 8 count dovetails (20 each A & B), brushed graphite, 800 lbs. Capacity per shelf /3,200 lbs. Max capacity, NSF. Reference Sheet Title K701; Foodservice Standard Details.
 - c. Products manufactured by Metro and Eagle, modified to comply with specifications, are acceptable.
 - 4. WALK-IN SHELVING
 - a. Cambro Model No. ESU SERIES *C013
 - b. Stationary Starter Unit, 21 "W x 48 "L x 72 "H, 4-tier, withstands temperature from -36°F (-38°C) to 190°F (88°C), includes: (4) vented reinforced polypropylene shelf plates wit Camguard® antimicrobial protection, (4) composite posts with leveling feet installed, pre-assembled post connectors & wedges, (8) stationary traverses & (4) bags of 8 count dovetails (16 each A & B), brushed graphite, 800 lbs. Capacity per shelf /3,200 lbs. Max capacity, NSF. Reference Sheet Title K701; Foodservice Standard Details.
 - c. Where the shelf is below the evaporator coil, adjust the height to fit.
 - d. Products manufactured by Metro and Eagle, modified to comply with specifications, are acceptable.

5. SPARE NUMBER
6. SPARE NUMBER
7. WALK-IN SHELVING
 - a. Cambro Model No. ESU SERIES*C013
 - b. Starter Unit, 21" W x 48" L x 72" H, 4-tier, withstands temperature from -36°F (-38°C) to 190°F (88°C), includes: (4) vented reinforced polypropylene shelf plates with Camguard® antimicrobial protection, (4) composite posts with leveling feet installed, pre-assembled post connectors & wedges, (8) stationary traverses & (4) bags of 8 count dovetails (16 each A & B), brushed graphite, 800 lbs. Capacity per shelf /3,200 lbs. Max capacity, NSF. Reference Sheet Title K701; Foodservice Standard Details.
 - c. Where the shelf is below the evaporator coil, adjust the height to fit.
 - d. Products manufactured by Metro and Eagle, modified to comply with specifications, are acceptable.
8. HAND SINK
 - a. Advance Tabco Model No. 7-PS-90*C013
 - b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus.
 - c. Products manufactured by Eagle and IMC Teddy, modified to comply with specifications, are acceptable.
9. SPARE NUMBER
10. SPARE NUMBER
11. HAND SINK
 - a. Advance Tabco Model No. 7-PS-90*C013
 - b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus.
 - c. Products manufactured by Eagle and IMC Teddy, modified to comply with specifications, are acceptable.
12. SPRAY SYSTEM
 - a. Spray Master Model No. 300-600WDF*C013
 - b. Pressure Washer Cleaning System, wall mount, Food Service Package, 2.2gpm @ 1100psi, 115v, adjustable chemical & sanitizer injectors, water level float switch assembly, pressure gauge, 3-cylinder high-temperature CAT plunger pump, SMT-200-RW manual rewind hose reel, 50 ft. Hi-pressure hose, 6 ft. Water supply hose, 36" spray gun assembly, Flo-Thru quick disconnects, (2) 1-gallon chemical baskets, 2 HP motor, stainless steel cover, frame, wall mount brackets, includes Hummer Jet Jr., wall & tile brush, and trap shooter accessories. Now includes SS accessory hanger.

- c. Provide unit with the following:
 - 1) 2.2 gallons per minute @ 1100 PSI, 115v/60/1ph, 15 amps.
 - 2) 75' High-Pressure Hose Exchange, upgrade from 30' hose.
 - 3) Wall Mount Unit.

- 13. MOBILE WORKTABLE
 - a. Atlanta Custom Fabricator
 - b. Provide fabricated stainless steel Mobile WorkTable, size, and shape, as shown on Drawings. Provide two drawers and an undershelf.
 - c. Provide stem casters per section 2.2 M2. Front casters to be provided w/ brakes
 - d. Provide table w/ 4" backsplash and rolled edge on front and ends.
 - e. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.

- 14. UTILITY CART
 - a. Cambro Model No. BC230110*C013
 - b. Service Cart, open design, (3) shelves, shelf size approximately 20" x 27", polyethylene exterior, 5" casters (2 fixed, two swivels, 1 with brake), 500 lb. load capacity, black, NSF.
 - c. Products manufactured by Lakeside and Vollrath, modified to comply with specifications, are acceptable.

- 15. PAN RACK
 - a. Cres Cor Model No. 207-UA-13A*C013
 - b. Rack, Mobile Utility, full height, open sides, (13) universal slides on 4-1/2" centers, multi-purpose, adjustable at 1-1/2" intervals, welded extruded aluminum frame, end loading, NSF
 - c. Provide unit with the following:
 - 1) 1056-002 Corner Bumpers, non-marking, gray.
 - d. Products manufactured by Lakeside and Metro, modified to comply with specifications, are acceptable.

- 16. VERTICAL CUTTER / MIXER
 - a. Hobart Model No. HCM450-3*C013
 - b. Cutter Mixer; includes Cut-Mix attachment, Knead-Mix attachment, Strainer Basket, & Mixing Baffle arm; US/EXPORT configuration.
 - c. Provide unit with the following:
 - 1) 480V/60/3 Phase.
 - d. Products manufactured by Berkel and Univex, modified to comply with specifications, are acceptable.

- 17. FLOOR TROUGH
 - a. Atlanta Custom Fabricator
 - b. Provide fabricated 14-gauge, stainless steel Floor Trough with a brushed satin finish. Floor Trough to be size and shape shown on drawings, 4" deep with steel anchor rods placed approximately 12" OC. Reference Sheet Title K702; Foodservice Standard Details.
 - c. Provide unit with the following:
 - 1) 6-1/2-inch diameter holes for drain assembly with 4" OD tailpiece and removable stainless steel perforated basket.
 - 2) Stainless steel subway grating.
 - d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this

specification.

18. VEG. PREP TABLE WITH SINK
 - a. Power Soak Model No. 50PSP66L3B1 MODIFIED*C013
 - b. Power Prep Intro, 66 "W x 30" D with 18 "W x 24-3/4 "D (front to back) wash sink, 2-bay with flexible tank divider, (1) removal basket, (1) filter assembly, hemmed end splash, squared channel rim, 9-1/2 "H backsplash, ball drain, NSF certified for washing skin-on produce, 115v/60/1-ph. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
 - c. (Item No. 18.1) Faucet, Wall / Splash Mount, T&S Brass Model No. B-0231-CR-KIT, Pantry Faucet, double, wall mount, 8" centers, 12" swing nozzle, lever handles, stream regulator tip, quarter-turn Cerama cartridge, low lead, (2) 24" flex hose, 1/2" NPT, NSF, ADA Compliant.
19. SPARE NUMBER
20. SPARE NUMBER
21. DISPOSER
 - a. Salvajor Model No. 200-SA-3-ARSS-LD*C013
 - b. Disposer, Sink Assembly, 3-1/2" sink collar, 2 Hp motor, start/stop push button, drain/flush/time delay, automatic reversing & water saving with safety line disconnect ARSS-LD control, includes a fixed nozzle, chrome plated vacuum breaker, solenoid valve, sink stopper & flow control, heat-treated aluminum alloy housing, UL, CSA, CE.
 - c. Provide unit with the following:
 - 1) 980105 Mounting bracket.
 - 2) Omit vacuum breaker and provide B0455-04, manufactured by T &S Brass and Bronze Works.
 - d. Products manufactured by Insinkerator and Red Goat, modified to comply with specifications, are acceptable.
22. FOOD PROCESSOR
 - a. Robot Coupe Model No. R602VV*C013
 - b. Combination Food Processor, 7-liter stainless steel bowl with handle, continuous feed kit with kidney-shaped & cylindrical-shaped hoppers, includes (1) "S" blade (27124), (1) grating disc (28058), (1) slicing disc (28064), pulse function, variable speed, 300 - 3500 RPM, 120v/60/1-ph, 20.0 amps, 3 HP, NEMA 5-20P, cETLus, ETL-Sanitation.
 - c. Provide unit with the following:
 - 1) LP3DISC LP3Disc, (3) disc package includes: (1) 3/16" grating disc, (1) 1/4" x 1/" julienne disc and (1) 3/16" slicing disc.
 - d. Products manufactured by Hobart and Berkel, modified to comply with specifications, are acceptable.
23. HAND SINK
 - a. Advance Tabco Model No. 7-PS-90*C013
 - b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus.
 - c. Products manufactured by Eagle and IMC Teddy, modified to comply with specifications, are acceptable.

24. WORK TABLE
- a. Atlanta Custom Fabricator
 - b. Provide fabricated, stainless steel Work Table, size, and shape, as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
 - c. Provide table w/ 4" backsplash and rolled edge on front and ends
 - d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
25. PREP TABLE WITH SINK
- a. Atlanta Custom Fabricator
 - b. Provide fabricated, stainless steel Prep Table with Sink, size, and shape, as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
 - c. Where shown on Drawings, cut out the top to accommodate a one-compartment sink. Sink compartment to be 14" deep. Paint exposed copper drain lines silver to match stainless steel table.
 - d. Where adjacent to the wall, provide a typical 8-inch high backsplash with 2-inch turnback on a 45-degree angle with enclosed welded ends. Front and sides to have a marine edge. Refer to Drawing for standard tabletop construction details.
 - e. (Item No. 25.1) Faucet, Wall / Splash Mount, T&S Brass Model No. B-0231-CR-KIT, Pantry Faucet, double, wall mount, 8" centers, 12" swing nozzle, lever handles, stream regulator tip, quarter-turn Cerama cartridge, low lead, (2) 24" flex hose, 1/2" NPT, NSF, ADA Compliant.
 - f. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
26. HOLDING / PROOFING CABINET
- a. Winston Foodservice Model No. HOV5-14UV*C013
 - b. Holding Cabinet, mobile, full-size, insulated, convection holding, accommodates (14) 18" x 26" Sheet Title pans or (28) 13" x 18" sheet pans or (28) 12" x 20" hotel pans, load limit 65 lbs (29.25 kg) per rack, (2) field reversible hinged solid dutch doors, magnetic door handle, C-Touch control with the processor, HACCP temperature downloads, USB & audio ports, manual water fill, stainless steel interior & exterior, NSF, CE, UL, cUL, UL-Sanitation.
 - c. Provide unit with the following:
 - 1) Right hand.
 - 2) Locking Door.
 - 3) Window in both upper & lower front doors.
 - 4) 5" Plate casters (2) with locking.
 - d. Products manufactured by Metro and Food Warming Equipment, modified to comply with specifications, are acceptable.
27. PREP TABLE WITH SINK
- a. Atlanta Custom Fabricator
 - b. Provide fabricated, stainless steel Prep. Table with Sink, size, and shape, as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
 - c. Where shown on Drawings, cut out the top to accommodate a one-compartment sink. Sink compartment to be 14" deep. Paint exposed copper drain lines silver to match stainless steel table.

- d. Where adjacent to the wall, provide a typical 8-inch high backsplash with 2-inch turnback on a 45-degree angle with enclosed welded ends. Front and sides to have a marine edge. Refer to Drawing for typical tabletop construction details. Reference Sheet Title K701; Foodservice Standard Details.
 - e. (Item No. 27.1) Faucet, Wall / Splash Mount, T&S Brass Model No. B-0231-CR-KIT, Pantry Faucet, double, wall mount, 8" centers, 12" swing nozzle, lever handles, stream regulator tip, quarter-turn Cerama cartridge, low lead, (2) 24" flex hose, 1/2" NPT, NSF, ADA Compliant.
 - f. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
28. WORK TABLE
- a. Atlanta Custom Fabricator
 - b. Provide fabricated stainless steel Work Table, size, and shape, as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
 - c. Provide table w/ 4" backsplash and rolled edge on front and ends
 - d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
29. SPARE NUMBER
30. SPARE NUMBER
31. SLICER TABLE
- a. Atlanta Custom Fabricator
 - b. Provide fabricated stainless steel top Slicer Table. Size and shape, as shown on Drawings. Reference Sheet Title K800; Foodservice Elevations.
 - c. The table will have a 5-inch recessed area for Slicer. Under this recessed area of the table, provide cabinet base construction as specified in paragraph 2.2, subparagraph B. Weld to the uprights 1-1/2 inch x 1-1/2 inch stainless steel angle brackets to accommodate four 18 inch x 26 inch Bun Pans.
 - d. Provide table with a 4-inch high rear backsplash with welded and enclosed sides and rear.
 - e. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
32. SLICER
- a. Berkel Model No. X13AE-PLUS*C013
 - b. Premium Food Slicer, manual or automatic operation, 13" diameter stainless steel knife, 45° gravity feed, adjustable slice thickness up to 1-5/16", ergonomic controls and index knob location, removable sharpener, permanent knife ring guard, sealed pushbutton controls, anodized aluminum gauge plate and knife cover, one-piece polymer base and product table (NSF approved) for reduced seams and easy cleaning, includes kickstand, product capacity up to 8½" round, 7½" square, or 10½" x 6¾" rectangular, includes no-volt release, 1/2 HP, 120v/60/1-ph, 8.0 amps, 6' power cord with NEMA 5-15P, cETLus, ETL-Sanitation (US/EXP configuration)
 - c. Products manufactured by Hobart and Globe, modified to comply with specifications, are acceptable.
33. PREP TABLE WITH SINK
- a. Atlanta Custom Fabricator

- b. Provide fabricated, stainless steel Prep. Table with sink, size, and shape as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
 - c. Where shown on Drawings, cut out the top to accommodate a one-compartment sink. Sink compartment to be 14" deep. Paint exposed copper drain lines silver to match stainless steel table.
 - d. Where adjacent to the wall, provide a typical 8-inch high backsplash with 2-inch turnback on a 45-degree angle with enclosed welded ends. Front and sides to have a marine edge. Refer to Drawing for typical tabletop construction details. Reference Sheet Title K701; Foodservice Standard Details.
 - e. (Item No. 33.1) Faucet, Wall / Splash Mount, T&S Brass Model No. B-0231-CR-KIT, Pantry Faucet, double, wall mount, 8" centers, 12" swing nozzle, lever handles, stream regulator tip, quarter-turn Cerama cartridge, low lead, (2) 24" flex hose, 1/2" NPT, NSF, ADA Compliant.
 - f. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
34. BAKERS TABLE
- a. Atlanta Custom Fabricator
 - b. Provide a fabricated stainless steel Baker's Table, size, and shape as shown on the Drawing. On the front edge, provide a reverse 1-1/2" rolled rim to catch flour. Reference Sheet Title K800; Foodservice Elevations.
 - c. Running the full length of the table over the rear, provide an over shelf supported on S/S supports. Sides and rear to flange up 2" and front shall have 1-1/2" rolled edge.
 - d. Sides and rear to have 5" high riser with coved corners and welded enclosed sides and rear.
 - e. Provide 3 tier drawer and open tubular base.
 - f. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
35. INGREDIENT BIN
- a. Cambro Model No. IB44148*C013
 - b. Ingredient Bin, mobile, 42-1/2 gallon capacity, molded polyethylene with sliding cover, (4) 3" heavy-duty casters (2 front swivel, two fixed), with bin, securely attached to the base plate, white with clear cover, NSF.
 - c. Products manufactured by Rubbermaid and Piper, modified to comply with specifications, are acceptable.
36. MIXER STAND
- a. Advance Tabco Model No. MX-SS-302*C013
 - b. Equipment Stand, with utensil rack, 30 "W x 24" D x 24 "H, 14/304 stainless steel top, 18 gauge stainless steel adjustable undershelf & legs, adjustable stainless steel bullet feet, NSF.
 - c. Products manufactured by Eagle and Piper, modified to comply with specifications, are acceptable.
37. 20 QUART MIXER
- a. Hobart Model No. HL200-1STD*C013
 - b. Bench type mixer; with bowl, beater, whip & spiral dough arm, US/EXP configuration - Legacy Planetary Mixer, Bench, 20 quarts, (3) fixed speeds plus stir speed, gear-driven transmission, 15-minute SmartTimer™, #12 taper hub, manual bowl lift,

- stainless steel bowl, aluminum "B" beater, stainless steel "D" wire whip, aluminum "ED" spiral dough arm, stainless steel bowl guard, 1/2 hp, cord with plug.
- c. Products manufactured by Berkel and Globe, modified to comply with specifications, are acceptable.
38. HAND SINK
- a. Advance Tabco Model No. 7-PS-90*C013
- b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus.
- c. Products manufactured by Eagle and IMC Teddy, modified to comply with specifications, are acceptable.
39. SPARE NUMBER
40. SPARE NUMBER
41. REFRIGERATOR
- a. Delfield Model No. GAR2NP-S*C013
- b. Refrigerator, Reach-In, Narrow, two-section, 46.0 cubic feet capacity, top-mounted self-contained refrigeration system, (2) full-height hinged solid doors (locking), (6) adjustable chrome wire shelves, 4.3" easyTouch® screen temperature display/control with remote monitoring, LED interior lighting, stainless steel exterior front, sides & interior, (4) 5" locking casters, GreenGenius™ R290 Hydrocarbon refrigerant, 0.35 HP, 115v/60/1-ph, 6.0 amps, NEMA 5-15P, NSF, cULus, ENERGY STAR®
- c. Provide unit with the following:
- 1) Left door hinged on left, right door hinged on the right, standard
- 2) Set of (4) 5" locking casters, standard
- d. Products manufactured by Traulsen and Beverage-Air, modified to comply with specifications, are acceptable.
42. SPARE NUMBER
43. ICE MACHINE
- a. Hoshizaki Model No. KM-520MAJ*C013
- b. Ice Maker, Cube-Style, 22 "W, air-cooled, self-contained condenser, production capacity up to 556 lb/24 hours at 70°/50° (480 lb AHRI certified at 90°/70°), stainless steel finish, crescent cube style, R-404A refrigerant, 115v/60/1-ph, 10.6 amps, NSF, UL, ENERGY STAR®.
- c. Provide unit with the following:
- 1) H9320-51 Water Filtration System, single configuration, 18.4" H (manifold & cartridge).
- d. Products manufactured by Manitowoc and Scotsman, modified to comply with specifications, are acceptable.
44. ICE BIN
- a. Hoshizaki Model No. B-300PF*C013
- b. Ice Bin, 22 "W, top-hinged front-opening door, 300-lb ice storage capacity, for top-mounted ice maker, vinyl clad, 6" painted flange legs included, protected with H-GUARD Plus Antimicrobial Agent, ETL, ETL-Sanitation.
- c. Products manufactured by Manitowoc and Scotsman, modified to comply with specifications, are acceptable.

45. WORK TABLE

- a. Atlanta Custom Fabricator
- b. Provide fabricated stainless steel Work Table, size, and shape, as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K800; Foodservice Elevations.
- c. Provide table w/ 4" backsplash and rolled edge on front and ends.
- d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.

46. POWER SOAK SINK

- a. Provide fabricated three compartment Power Soak Sink, with drainboards, size, and shape, as shown on Drawings. Reference Sheet Title K800; Foodservice Elevations.
- b. The sink compartments shall each be 15 inches deep. Paint exposed copper drain lines silver to match stainless steel table.
- c. Where the table is adjacent to the wall, provide with 8-inch high backsplash against the wall. Provide front and right side with raised rolled rim.
- d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
- e. Bi-line VWS Vortex Wash System
 - 1) Factory authorized startup.
 - 2) Type 304 polished stainless steel construction.
 - 3) 14 gauge stainless tanks and drainboards.
 - 4) 11" high x 2-1/2" deep backsplash.
 - 5) (3) Twist handle drains on wash, rinse, and sanitizer tanks.
 - 6) Stainless steel legs and cross rails.
 - 7) Flanged feet.
 - 8) Stainless steel pump and impeller.
 - 9) Rear discharge.
 - 10) Removable strainer plates.
 - 11) One 3 Hp TEFC fully enclosed wash pump motor with permanently sealed bearings.
 - 12) Motor overload protection, manual reset.
 - 13) Low water protection for wash pump motor.
 - 14) 3,000-watt wash tank heater.
 - 15) 1 year parts and labor on pumps and control panel.
- f. All stainless steel construction.
- g. 37" soiled drainboard with 1.5" rolled end.
- h. 18" scrap sink.
- i. 12" transition drainboard to house controls, pump, and heater.
- j. 36" wash sink.
- k. 20" rinse sink.
- l. 20" sanitize sink.
- m. 37" clean drainboard with 1.5" rolled end.
- n. Direction from soiled to clean end right to left.
- o. 480/60/3 electrical.
- p. Utensil basket.
- q. Sheet pan racking system.
- r. (Item No. 46.1 & 46.2) (2) Faucet, Wall / Splash Mount, T&S Brass Model No. B-0231-CR-KIT, Pantry Faucet, double, wall mount, 8" centers, 12" swing nozzle, lever handles, stream regulator tip, quarter-turn Cerama cartridge, low lead, (2) 24" flex hose, 1/2" NPT, NSF, ADA Compliant.

- s. (Item No. 46.3) Pre-Rinse, Model No. T & S Brass B-0133
 - t. Products manufactured by Hobart and Power Soak modified to comply with specifications are acceptable.
47. HAND SINK
- a. Advance Tabco Model No. 7-PS-90*C013
 - b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus.
 - c. Provide unit with the following:
 - 1) 7-PS-17 Welded Side Splash, 7-3/4 "H (installed height), both sides, splash mounted faucets.
 - d. Products manufactured by Eagle and IMC Teddy modified to comply with specifications are acceptable.
48. SOILED DISH TABLE WITH PRE-RINSE FAUCET
- a. Future
49. SPARE NUMBER
50. SPARE NUMBER
51. SPARE NUMBER
52. SILVER SOAK SINK
- a. Future
53. DISPOSER
- a. Future
54. DISHWASHER WITH BOOSTER HEATER
- a. Future
55. STAINLESS STEEL DUCT
- a. Future
56. CLEAN DISH TABLE
- a. Future
57. WALL SHELF
- a. Future
58. HOSE REEL
- a. T&S Brass Model No. B-7242-10*C013
 - b. Hose Reel System, open, 3/8" x 50' hose with extended spray wand, with ratcheting system & adjustable hose bumper, epoxy-coated steel. Reference Sheet Title K703; Foodservice Standard Details.
 - c. 0RK2 Shut-Off Control Valve, 6" long, adjustable wall flange, polished chrome cross handle, blue index, includes (2) bushings 1/2" male x 3/8" female NPT, rough brass body, 1/2" female NPT, ADA Compliant, ANSI, NSF.
 - d. (2) B-CVH1-2 Check Valve, 1/2" NPT female, horizontal.
 - e. B-0512 Concealed Mixing Faucet, 4-arm handles, 3/8" NPT inlets & outlets, 3" centers.

- f. B-0109-01 Wall Bracket, 6".
 - g. EB-0107 Spray Valve, blue.
 - h. Products manufactured by Chicago Faucet and Fisher Faucets, modified to comply with specifications, are acceptable.
59. SPARE NUMBER
60. SPARE NUMBER
61. MOBILE POT & PAN SHELF
- a. Cambro Model No. EMU SERIES*C013
 - b. Mobile Unit, 21 "W x 48 "L x 70 "H, 4-tier, withstands temperature from -36°F (-38°C) to 190°F (88°C), includes: (4) vented reinforced polypropylene shelf plates with Camguard® antimicrobial protection, (4) composite posts, pre-assembled post connectors & wedges, (8) mobile traverses & (4) bags of 8 count dovetails (16 each A & B), (4) premium swivel casters with total locking brake, 750 lbs. max capacity, brushed graphite, NSF.
 - c. Products manufactured by Metro and Eagle, modified to comply with specifications, are acceptable.
62. UTILITY DISTRIBUTION SYSTEM
- a. Gaylord Industries DH-IM-E3/E5-HC-SG-20.17*C013
 - b. Size and shape as shown on plans
 - c. System shall be completely pre-wired and pre-piped to a single connection point as required by the equipment served. There shall be a 25% over-capacity for code requirements, and 25% over-capacity for future changes in equipment.
 - d. The UDS shall be UL listed under the category "Commercial Appliance Outlet Center" and manufactured in accordance with NEC, NFPA 96, UPC, NSF using only UL and AGA certified components.
 - e. Construction shall be entirely of type 304 stainless steel #4 finish, not less than 18 gauge. The UDS shall have a peaked cap on the horizontal raceway, and vertical raceway at each end.
 - f. All hardware for utility interconnects for multiple section raceways shall be provided for field assembly
 - g. The main riser shall enclose the main circuit breakers with disconnect handle and shunt trip coil for fuel shut off. Also included in the main riser are switches, relays, solenoid valves and terminal blocks necessary for fuel shut down of the equipment served.
 - h. The main three phase power is located in the primary riser. Circuit breakers are also located in the primary riser. Status lights to each breaker shall be mounted to the main vertical raceway.
 - i. The main breaker, emergency kill switch, gas valve reset, ventilator light switch. Convenience outlet and equipment status lights shall be clearly engraved on plastic laminate labeling which is mounted to the front of the main access door.
 - j. Cord and plug sets with restraint devices shall be provided for all equipment items. Final connections to the equipment served shall be by project electrician.
 - k. Gas system shall consist of black iron gas manifold, provided with pre-wired electric gas valve. Unions shall be provided at each end of the field joint. Each out let shall contain AGA approved ¼ turn shut off valve and quick disconnect coupling. PVC covered stainless steel flexible gas hoses with safety restraining cable device shall be provided for each piece of gas powered equipment.
 - l. Hot and cold water supply lines shall be hard drawn type L copper insulated with

1/2" thick cellular foam insulation. Provide hose connections to equipment as required. Each hose connection shall be provided with ¼ turn ball valve and two wat disconnect coupling. A combination pressure/temperature gauge shall be provided for the hot water line. Shock arrestors shall be installed at the hot and cold water supply inlets. Each water connection to the cooking equipment shall be provided with a stainless steel flexible hose covered with antimicrobial PVC. Final plumbing connections to the equipment served shall be by project plumber.

- m. Start up and commissioning of the UDS shall be by authorized Gaylord Service Agent to include: complete inspection of system to insure all field connections have been properly made. Verify correct incoming line voltages. Test each circuit breaker and verify status light functioning. Check for any plumbing leaks.

63. EXHAUST HOOD

- a. Gaylord Industries ELX-GBDAV-BB-AV-144*C013
- b. Each ventilator shall be designed specifically for the cooking equipment being covered. Construction shall be of a minimum 18-gauge, 300 series, #4 finish stainless steel. Top of unit shall be 16 Size and shape per drawings. Hanger brackets, pre-punched on 12" centers, shall run the entire length of the hood, one rear, one front and one center for maximum support and flexibility in installing the hood(s).
- c. The ventilator shall include a stationary grease collecting gutter at the bottom of the grease extraction device, sloped to a drain at one end to a built-in stainless-steel grease drawer. The sloped gutter shall be concealed by an apron which extends the full length of the hood.
- d. The condensate gutter in the front of the ventilator shall be capped and sealed to NSF standards.
- e. Grease extraction shall be by means of Gaylord "XGS" super high efficiency extractors capturing 99% of the grease to between 5 and 7 micron in size. Extractors shall be listed and tested per ASTM F2519, and be easily removable for cleaning by utilizing the provided extractor removal tool.
- f. The ventilator shall include a built-in 3" air space at the rear for compliance to NFPA-96 when mounting against a limited combustible wall. When mounting to a wall also provide side panels to enhance capture performance.
- g. The ventilator shall include a static pressure port in each section to be used in balancing the static pressure. Also included shall be a super capture lip on the front panel for enhancement of smoke and grease capture. Capture testing shall be to UL710 and ASTM 1704.
- h. Provide Gaylord Modulating Dampers. Dampers shall be an opposed blade balancing damper that modulate on command from the DCV-AV Control Center, and accessible from below the hood. The hood shall be listed under the category "Exhaust Hood with Exhaust Damper".
- i. Provide as shown on drawings recessed LED light fixtures. Light fixtures shall be factory pre-wired to a single connection point. Ventilators built in multiple sections shall be furnished with coiled flex conduit for interconnecting sections. Lights shall produce a minimum of 50 foot candle light at any point under the ventilator
- j. Provide complete Ansul R-102 Restaurant Fire Suppression System. Ansul system shall include factory pre-piping of ventilator and field installation of complete system including control cabinet and chemical bottles. System shall comply with UL 1254, 300, NFPA 96 and NFPA 17A. Included in system shall be one balloon test for the state and or local Fire Marshall.
- k. The ventilator shall achieve its low air flow rates without the use of internal motors, plenums or jets. The ventilator shall also include a super capture lip on the front panel for the enhancement of smoke and grease capture.

- l. The ventilator shall include auto start thermostats and controls to meet current IMC codes.
 - m. The exhaust hood shall be listed to UL Standard 710 and NSF. The ventilator shall comply with all requirements of NFPA-96, IMC, UMC, BOCA, and SBCCI model Codes.
 - n. Provide model C-150/LS hood mount fan start/stop switch and light switch.
 - o. Furnish Gaylord Demand Control Ventilation system model DCV-AV-LA-E2M1-HS5-DC-ST-TR to reduce kitchen operational and utility cost by conserving energy through reduction of exhaust and make up air. The system shall be comprised of a wall mounted command center, variable frequency drive(s), modulating dampers and sensible heat detectors and canopy mounted system over ride. Command center shall include color touch screen HMI digital controls, room ambient sensor, fire suppression integration controls, and VFD interface terminals. Command center shall have learning logic ability to review the previous twenty days activity and program for most efficient air volumes.
 - p. Ventilator Items #63 and #118 shall all be serviced from a central exhaust fan, controlled by the DCV-AV Command Center.
 - q. RTDs shall be mounted inside the hood canopy, each RTD shall have programmable temperature adjustments.
 - r. Variable frequency drive(s) shall be provided by Gaylord.
 - s. Scope of work:
 - t. KEC. Install command center per specified drawing location. Coordinate high and low voltage wiring connections, VFD cabling, any conduit, and wall or ceiling penetrations.
 - u. Electrical Contractor, coordinated by KEC. Provide dedicated circuit to the command center, RJ45 cable interfacing the controller with individual hood sections, provide electrical service to supply and exhaust fan motors. Each hood section shall require 120v service. Connect low voltage wire between hood sections per wiring schematics. Provide all wiring needed to connect hood fire protection system to the command center. Provide all low voltage cabling from command center to VFDs. Provide all three phase wiring from fans to VFDs. Verify proper fan rotation.
 - v. Gaylord authorized service agent: Verify all final cable connections are properly installed. Shall perform the complete start up and commissioning of the DCV-AV system. Set all hoods to design air flow. Adjust the VFD set points. Verify complete DCV system functionality. Provide up to three site visits to assist with other trades
 - w. The ventilator(s) shall be started up and final damper adjustments made to ensure operation is within specified air volumes and static pressures. Startup shall be by Gaylord authorized service agent.
 - x. Provide supply air plenum model PBW-19. Plenum box shall be sized per drawing, contain balancing dampers, and be constructed of all type 304 stainless steel. PBW unit shall have mounting brackets the full length of the plenum in front and back, pre punched at 12" intervals for easy mounting to structure above. Unit shall have perforated stainless steel discharge panels.
 - y. Capture and containment per ASHRAE STD 154
 - z. The command center shall be listed to UL 508A, UL 710, and UL 873. Compliant to NSF Standard No. 2
64. RANGE
- a. Garland Model No. 36ES15*C013
 - b. Heavy Duty Range, electric, electric, 18", Add-A-Unit, (2) boiling plates, heat switches, storage base, 3" (76mm) high vent riser, stainless steel front, sides and front rail, 6kW, cCSAus, NSF.

- c. Provide unit with the following:
 - 1) 6" Stainless steel adjustable legs - set of four.
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Hobart and Lang, modified to comply with specifications, are acceptable.
65. COMBI OVEN
- a. Vulcan Model No. ABC7E*C013
 - b. Combi Oven/Steamer, electric, boilerless, (7) 18" x 26" full-size sheet or (14) 12" x 20" full-size hotel pan capacity, (3) knobs with LED displays for temperature, timer & humidity, auto-adjustment of humidity with temperature selection, auto-reversing fan with the electronic braking system, cool to touch glass door, flashing door light and audible alert, (4) Grab n Go wire racks, stainless steel interior & exterior, engineered & UL EPH Classified, cULus.
 - c. Provide unit with the following:
 - 1) 480v/60/3-ph, 28.9 amps, 24kW, standard
 - 2) Filtration System.
 - 3) CB30K-SYSTEM Single Hollow Carbon Filter System, with 30,000-gallon capacity, for chlorine and chloramine reduction, sediment, bad tastes & odors, total organic compounds, tannins & trihalomethanes, ANSI/NSF 42 & 53.
 - 4) Opted out of Reverse Osmosis System.
 - 5) STAND-ABC/SS Stand, open frame, stainless steel, with adjustable feet, includes: spray hose & drip tray.
 - 6) SPRAY-ABC Spray Hose Kit, Provided with ABC Stand or ABC Stacking Kits - includes spray handle, 8 ft. stainless steel braided hose, and mounting hardware.
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Cleveland and Blodgett, modified to comply with specifications, are acceptable.
66. COMBI OVEN
- a. Vulcan Model No. ABC7E*C013
 - b. Combi Oven/Steamer, electric, boilerless, (7) 18" x 26" full-size sheet or (14) 12" x 20" full-size hotel pan capacity, (3) knobs with LED displays for temperature, timer & humidity, auto-adjustment of humidity with temperature selection, auto-reversing fan with the electronic braking system, cool to touch glass door, flashing door light and audible alert, (4) Grab n Go wire racks, stainless steel interior & exterior, engineered, UL EPH Classified, cULus.
 - c. Provide unit with the following:
 - 1) 480v/60/3-ph, 28.9 amps, 24kW, standard.
 - 2) Filtration System.
 - 3) CB30K-SYSTEM Single Hollow Carbon Filter System, with 30,000-gallon capacity, for chlorine and chloramine reduction, sediment, bad tastes & odors, total organic compounds, tannins & trihalomethanes, ANSI/NSF 42 & 53
 - 4) Opted out of Reverse Osmosis System.
 - 5) STAND-ABC/SS Stand, open frame, stainless steel, with adjustable feet, includes: spray hose & drip tray.
 - 6) SPRAY-ABC Spray Hose Kit, Provided with ABC Stand or ABC Stacking Kits - includes spray handle, 8 ft. stainless steel braided hose, and mounting hardware.
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Cleveland and Blodgett, modified to comply with

specifications, are acceptable.

67. CONVECTION OVEN
- a. Blodgett Model No. MARK V-100 DBL*C013
 - b. Convection Oven, electric, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment, (SSD) solid-state digital controls, 2-speed fan, interior light, simultaneously operated doors with glass, stainless steel front, sides & top, vent connector, vent connector, 11.0 kW each, 1/3 hp, cETLus, CE, NSF, ENERGY STAR®.
 - c. Provide unit with the following:
 - 1) (2) 480v/60/3-ph, 11.0 kW, 14.0 amps (per deck).
 - 2) (2) Solid stainless steel back.
 - 3) 6" legs, adjustable, stainless steel (set), standard.
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Garland, Southbend and Cleveland, modified to comply with specifications, are acceptable.
68. CONVECTION OVEN
- a. Blodgett Model No. MARK V-100 DBL*C013
 - b. Convection Oven, electric, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment, (SSD) solid-state digital controls, 2-speed fan, interior light, simultaneously operated doors with glass, stainless steel front, sides & top, vent connector, 6" stainless steel legs, vent connector, 11.0 kW each, 1/3 hp, cETLus, CE, NSF, ENERGY STAR®.
 - c. Provide unit with the following:
 - 1) (2) 480v/60/3-ph, 11.0 kW, 14.0 amps (per deck).
 - 2) (2) Solid stainless steel back.
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Garland, Southbend and Cleveland, modified to comply with specifications, are acceptable.
69. SPARE NUMBER
70. SPARE NUMBER
71. HEAT & HOLD CABINET
- a. Cres Cor Model No. RO-151-FWUA-18DE*C013
 - b. Rethermalization/Convection/Hold Oven, AquaTemp™, reach-in, full size, single cavity, (18) sets of universal angles adjustable on 1-1/2" center, fully insulated, solid-state electric control convection oven, standard controls, with temp. & humidity control, LED digital display, field reversible Dutch doors, antimicrobial latches, integral drip trough, (4) heavy-duty 5" swivel casters (2) braked, stainless steel construction, cCSAus, CSA.
 - c. Provide unit with the following:
 - 1) (2) Key lock handles (per door) (2 required).
 - 2) Tempered glass door window (per door).
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Winston and Food Warming Equipment, modified to comply with specifications, are acceptable.
72. TILT SKILLET
- a. Cleveland Range Model No. SEL-40-T1*C013

- b. Tilting Skillet, electric, 40-gallon capacity, bead-blasted cooking surface, 10° tilt cooking feature, easy manual hand tilt, spring-assisted cover with vent, gallon & liter markings, stainless steel construction with open leg frame, 208v/60/3-ph, UL, CE, NSF.
 - c. Provide unit with the following:
 - 1) Performance start-up included at customer request after the equipment is installed (Free Water Quality Check included).
 - 2) (VOSK3) 480v/60/3-ph, 18kW, 21.7 amp.
 - 3) TD2SK 2" tangent draw-off valve, front-mounted left side.
 - 4) DKFS Double Pantry Skillet Filler, with 60" hose.
 - 5) FBST1 Faucet Brackets.
 - 6) FSSK Food Strainer, 30 & 40 gallons.
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Groen and Market Forge, modified to comply with specifications, are acceptable.
73. FLOOR TROUGH
- a. Atlanta Custom Fabricator
 - b. Provide fabricated 14-gauge, stainless steel Floor Trough with a brushed satin finish. Floor Trough to be size and shape as shown on drawings, 4" deep with steel anchor rods placed approximately 12" OC. Reference Sheet Title K701; Foodservice Standard Details.
 - c. Provide unit with the following:
 - 1) (1) 6-1/2-inch diameter holes for drain assembly with 4" OD tailpiece and removable stainless steel perforated basket.
 - 2) Stainless steel subway grating.
 - d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
74. COMBI OVEN
- a. Vulcan Model No. ABC7E*C013
 - b. Combi Oven/Steamer, electric, boilerless, (7) 18" x 26" full-size sheet or (14) 12" x 20" full-size hotel pan capacity, (3) knobs with LED displays for temperature, timer & humidity, auto-adjustment of humidity with temperature selection, auto-reversing fan with the electronic braking system, cool to touch glass door, flashing door light and audible alert, (4) Grab n Go wire racks, stainless steel interior & exterior, engineered, UL EPH Classified, cULus.
 - c. Provide unit with the following:
 - 1) 480v/60/3-ph, 28.9 amps, 24kW, standard.
 - 2) Filtration System.
 - 3) CB30K-SYSTEM Single Hollow Carbon Filter System, with 30,000-gallon capacity, for chlorine and chloramine reduction, sediment, bad tastes & odors, total organic compounds, tannins & trihalomethanes, ANSI/NSF 42 & 53.
 - 4) Opted out of Reverse Osmosis System.
 - 5) STAND-ABC/SS Stand, open frame, stainless steel, with adjustable feet, includes: spray hose & drip tray.
 - 6) SPRAY-ABC Spray Hose Kit, Provided with ABC Stand or ABC Stacking Kits - includes spray handle, 8 ft. stainless steel braided hose, and mounting hardware.
 - d. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - e. Products manufactured by Alto-Shaam and Convotherm, modified to comply with specifications, are acceptable.

75. HEAT & HOLD OVEN
- a. Cres Cor Model No. RO-151-FWUA-18DE*C013
 - b. Rethermalization/Convection/Hold Oven, AquaTemp™, reach-in, full size, single cavity, (18) sets of universal angles adjustable on 1-1/2" center, fully insulated, solid-state electric control convection oven, standard controls, with temp. & humidity control, LED digital display, field reversible Dutch doors, antimicrobial latches, integral drip trough, (4) heavy-duty 5" swivel casters (2) braked, stainless steel construction, cCSAus, CSA.
 - 1) (2) Key lock handles (per door) (2 required).
 - 2) Tempered glass door window (per door).
 - c. Utilities are furnished thru Item No. 62, Utility Distribution System.
 - d. Products manufactured by Winston and Food Warming Equipment, modified to comply with specifications, are acceptable.
76. HAND SINK
- a. Advance Tabco Model No. 7-PS-90*C013
 - b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus
 - c. Provide unit with the following:
 - 1) 7-PS-17 Welded Side Splash, 7-3/4 "H (installed height), both sides, splash mounted faucets
 - d. Products manufactured by Eagle and IMC Teddy, modified to comply with specifications, are acceptable.
77. HAND SINK
- a. Advance Tabco Model No. 7-PS-90*C013
 - b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus.
 - c. Products manufactured by Eagle and IMC Teddy, modified to comply with specifications, are acceptable.
78. MOM'S KITCHEN COUNTER
- a. Delfield
 - b. Provide breaker panel box and prewire entire line-up with necessary circuits. Reference Sheet Title K803; Foodservice Serving Counter Details.
 - c. (Item No. 82) Tray Dispenser, Model No. TT2-1014.
 - d. (Item No. 83) Drop-In Hot Wells, Model No. N8773 - built-in electric hot food unit with individually heated wells, holds (5) 12" x 20" pans (by others). Provide with drain and valve.
 - e. (Item No. 84) Sneezeguard Model No. DCFSFS service flexible food shield, single tier, converts to three positions, to go over (Item No. 83) Drop-In Hot Wells.
 - f. Install 54" Hatco halogen heat lamp w/Xenon lights.
 - g. Remove refrigerated base and provide an S/S front
 - h. Modify to be the rear breather
 - i. Mounted by manufacturer: include line (Item No. 85) Drop-In Frost Top N8425P built-in mechanically cooled frost top.
 - j. Compressor base mounted with 14" hinged removable louvered door with slide-out assembly
 - k. (Item 86) Sneezeguard Model DCFSFS service flexible food shield, single tier,

converts to three positions, to go over (Item No. 85) Drop-In Frost Top. All wiring go down through post and not a chase.

- l. DCFSLED – LED light
 - m. (Item No. 87) Beverage Refrigerator, Structural Concepts Model No. CO37R
 - n. (Item No. 89) Refrigerated Salad / Sandwich Refrigerator, F15PC48DP view display pass-thru.
 - o. Remove the refrigerated base and provide S/S front.
 - p. Modify to be the rear breather
 - q. (Item No. 88) Drop-In Ice Cream Freezer, Model No. N227-P built-in self-contained ice cream freezer – 12-gallon cabinet capacity - pre-wired to base
 - r. Compressor base mounted with 14" hinged removable louvered door with slide-out assembly
 - s. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
79. SPARE NUMBER
80. SPARE NUMBER
81. FLATWARE CART
- a. Provide fabricated stainless steel Flatware/Napkin Table, size, and shape, as shown on Drawings. Provide with an open base. Provide stem casters per section 2.2 M2. Front casters to be provided with brakes. Provide cut out for 12" x 20" pan.
 - b. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
82. TRAY DISPENSER
- a. Delfield Model No. TT2-1014*C013
 - b. Dispenser, Tray, open frame mobile design, dual self-elevating tray platforms, for 11" x 15" trays, 4" casters, NSF
 - c. Products manufactured by Colorpoint and Lakeside, modified to comply with specifications, are acceptable.
83. DROP-IN HOT WELL
- a. Delfield Model No. N8773-D*C013
 - b. Drop-In Hot Food Well Unit, Electric, individual pans, wet/dry type with drain & manifold, 5-pan size for 12" x 20" pans, individual infinite temperature controls, stainless steel top & wells, galvanized outer liner, (72-3/8" x 25" cutout required), cUL, UL, NSF
 - c. Provide unit with the following:
 - 1) 000-504-0031 Autofill assembly kit.
 - d. Products manufactured by Atlas and Wells, modified to comply with specifications, are acceptable.
84. SNEEZE GUARD
- a. This item is specified with Item No. 78, Mom's Kitchen Counter
85. DROP-IN FROST TOP
- a. Delfield Model No. N8245P*C013
 - b. Drop-In Frost Top, stainless steel 1" elevated top with drain trough & 2" overhang, galvanized steel exterior housing, on/off toggle switch, self-contained refrigeration, R290 refrigerant, 1/5 HP, (44-5/8" x 25" cutout required), cUL, UL, NSF.
 - c. Products manufactured by Atlas and Wells, modified to comply with specifications,

are acceptable.

86. SNEEZE GUARD
- a. This item is specified with Item No. 78, Mom's Kitchen Counter
87. BEVERAGE REFRIGERATOR
- a. Structural Concepts Model No. CO37R*C013
 - b. Self-Service Refrigerated Case, 36-1/4"W, 79-3/4"H, Breeze-E (Type II) with EnergyWise self-contained refrigeration system, Blue Fin coated coil, (4) non-lit adjustable metal shelves, top light, one-piece formed ABS plastic tub, black interior, (2) full end panels, 4"D removable wall spacer brackets, casters, cETLus, ETL-Sanitation
 - c. Provide unit with the following:
 - 1) If GFCI is required, a GFCI breaker MUST be used in lieu of a GFCI receptacle.
 - 2) 34" Minimum entry door clearance required (without shipping skid & with rear spacer bracket removed).
 - 3) Breeze-E (Type II) with EnergyWise refrigeration - NSF Type II compliant, standard.
 - 4) Compressor air intake from front & out rear, unit MUST remain 4" from wall & front panel cannot be blocked.
 - 5) Base Support: Casters, with levelers, standard.
 - 6) Interior: Stainless steel, in lieu of standard black.
 - 7) Exterior: Stainless steel.
 - 8) Lower front panel: Stainless steel.
 - 9) Stainless Steel Exterior.
 - 10) Left end panel: Full with mirrored interior, vinyl edging, standard.
 - 11) Right end panel: Full with mirrored interior, vinyl edging, standard.
 - 12) Back Panel: Solid rear swinging door (service RH hinge) with lock.
 - 13) Digital Fahrenheit thermometer, standard.
 - 14) Add Lights (LED) to standard shelves (4).
 - 15) Night curtain: Retractable, non-locking.
 - d. Products manufactured by Federal and RPI, modified to comply with specifications, are acceptable.
88. DROP-IN ICE CREAM DIPPING CABINET
- a. Delfield Model No. N227P*C013
 - b. Ice Cream Dipping Cabinet/Freezer, drop-in type, 12-gallon capacity, self-contained, removable cover with handle, stainless steel top, and lid, includes (1) 13" x 25" stainless steel louver, 1/4 HP, (29.62" x 26.62" cutout required), R290 Hydrocarbon refrigerant, UL, NSF.
 - c. Products manufactured by Atlas and Perlick, modified to comply with specifications, are acceptable.
89. REFRIGERATED SALAD/SANDWICH DISPLAY
- a. Delfield Model No. F15PC48DP*C013
 - b. Refrigerated Display Case, 48"W, 22.3 cu. ft. capacity, pass-through, (4) glass sliding doors, (3) adjustable epoxy coated wire shelves, electronic control, LED lighting, storage base with doors, ABS plastic interior, stainless steel exterior, R290 refrigerant, 1/3 HP, 115v/60/1-ph, 7.9 amps, NEMA 5-20P, UL, cUL, NSF
 - c. Products manufactured by Colorpoint and Structural Concepts, modified to comply with specifications, are acceptable.

90. SPARE NUMBER
91. POINT OF SALE
 - a. By Owner
92. PASS-THRU HEATED CABINET
 - a. Traulsen Model No. RHF132WP-FHS*C013
 - b. Heated Cabinet, Pass-thru, one-section, stainless steel exterior and interior, standard depth cabinet, full-height door or doors with Santoprene® EZ-Clean Gaskets, (3) clear coated adjustable shelves per Section, microprocessor controls, 6" adjustable stainless steel legs, NSF, UL, ENERGY STAR®.
 - c. Provide unit with the following:
 - 1) Thermometer side door: hinged on left.
 - 2) The rear door hinged on the right.
 - 3) 11 pair Universal tray slide per section.
 - d. Products manufactured by True and Victory, modified to comply with specifications, are acceptable.
93. PASS-THRU REFRIGERATOR
 - a. Traulsen Model No. RHT132WPUT-FHS*C013
 - b. Refrigerator, Pass-thru, one-section, self-contained refrigeration, StayClear™ Condenser, stainless steel exterior and interior, standard depth, wide full-height door or doors with Santoprene® EZ-Clean Gaskets, (3) adjustable wire shelves per Section, microprocessor controls, 6" adjustable stainless steel legs, 1/3 HP, cULus, NSF.
 - c. Provide unit with the following:
 - 1) Thermometer side door: hinged on left
 - 2) Rear door hinged on right.
 - 3) 11 pair Universal tray slide, per section
 - d. Products manufactured by True and Victory, modified to comply with specifications, are acceptable.
94. HOT SANDWICH /PIZZA COUNTER
 - a. Delfield
 - b. Open shelf utility stand. Reference Sheet Title K803; Foodservice Serving Counter Details.
 - c. Provide a breaker panel box and prewire the entire line-up with necessary circuits.
 - d. (Item No. 96) Tray/Rack Dispenser TT2-1014
 - e. (Item No. 97) Drop-In Hot Wells N8773 built-in electric hot food unit with individually heated wells, holds (5) 12" x 20" pans (by others). Provide with drain and valve.
 - f. (Item No. 98) Sneezeguard model DCFSFS service flexible food shield, single tier, converts to three positions, to go over Hot Food Wells (Item No. 97)
 - g. 54" Hatco halogen heat lamp w/Xenon lights.
 - h. All wiring to go down through posts and not a chase.
 - i. Mounted by manufacturer
 - j. (Item No. 101) Sandwich Warmer Hatco GR2SDS-24D 75" open utility stand with space for countertop unit – supplied and installed by others) – pre-wired in base
 - k. Item No. 102) Drop-In Frost Top N8245P built-in mechanically cooled frost top.
 - l. Compressor base mounted with 14" hinged removable louvered door with slide-out assembly (Item No. 103) Sneezeguard Model No. DCFSFS service flexible food shield, single tier, converts to three positions, to go over frost top item 102 (Drop-

- In Frost Top)
 - m. DCFSLED – LED light
 - n. Provide unit with the following:
 - 1) All wiring go down through posts and not a chase., Mounted by manufacturer
 - 2) Item No. 104 Beverage Refrigerator Structural Concepts Model No. NE3635RSSV
 - 3) Item No. 105 Drop-In Ice Cream Freezer Model No. N227-P built-in self-contained ice cream freezer – 12-gallon cabinet capacity - pre-wired to base
 - 4) Compressor base mounted with 14" hinged removable louvered door with slide-out assembly
 - 5) item 106 Model No. Structural Concepts model NE3635RSSV
 - 6) item 107 Model No. 1035B Drop-In Frost Top.
 - 7) Compressor base mounted with 14" hinged removable louvered door with slide-out assembly
 - 8) item no.108 Sneezeguard Model No. DCFSFS service flexible food shield, single tier, converts to three positions, to go over (Item No. 107) Drop-In Frost Top
 - o. DCFSLED – LED light
 - 1) Have all wiring go down through posts and not a chase.
 - 2) Mounted by the manufacturer
 - p. (Item No. 111) Drop-In Hot Wells N8745 built-in electric hot food unit with individually heated wells, holds (3) 12" x 20" pans (by others). Provide with drain and valve.
 - q. (Item No. 112) Sneezeguard Model No. DCFSFS service flexible food shield, single tier, converts to three positions, to go over (Item 111) Hot Food Wells
 - r. 30" Hatco halogen heat lamp w/Xenon lights.
 - s. All wiring go down through posts and not a chase.
 - t. Mounted by manufacturer
 - u. (Item No. 113) Pizza Warmer 65" open utility stand with space for countertop unit (supplied and installed by others) – pre-wired in base
 - v. (Item No. 114) Sneezeguard Model No. DCFSFS service flexible food shield, single tier, converts to three positions, to go over item 113, Pizza Warmer.
 - w. 42" Hatco halogen heat lamp w/Xenon lights.
 - x. All wiring go down through posts and not a chase.
 - y. Mounted by the manufacturer
 - z. Full body tray slides sized per plan
 - aa. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
95. FLATWARE CART
- a. Atlanta Custom Fabricator
 - b. Provide fabricated, stainless steel Flatware/Cart, size, and shape, as shown on Drawings. Provide with an open base. Provide stem casters per section 2.2 M2. Front casters to be provided with brakes. Provide cut out for 12" x 20" pan.
 - c. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
96. TRAY DISPENSER
- a. Delfield Model No. TT2-1014*C013
 - b. Dispenser, Tray, open frame mobile design, dual self-elevating tray platforms, for 11" x 15" trays, 4" casters, NSF.
 - c. Products manufactured by Colorpoint and Lakeside, modified to comply with

specifications, are acceptable.

97. DROP-IN HOT WELL
 - a. Delfield Model No. N8773-D*C013
 - b. Drop-In Hot Food Well Unit, Electric, individual pans, wet/dry type with drain & manifold, 5-pan size for 12" x 20" pans, individual infinite temperature controls, stainless steel top & wells, galvanized outer liner, (72-3/8" x 25" cutout required), cUL, UL, NSF.
 - c. Provide unit with the following:
 - 1) 000-504-0031 Autofill assembly kit (shipped loose).
 - d. Products manufactured by Atlas and Wells, modified to comply with specifications, are acceptable.

98. SNEEZE GUARD
 - a. This item is specified with Item No. 94, Hot Sandwich /Pizza Counter.

99. PASS-THRU HEATED CABINET
 - a. Traulsen Model No. RHF132WP-FHS*C013
 - b. Heated Cabinet, Pass-thru, one-section, stainless steel exterior and interior, standard depth cabinet, full-height door or doors with Santoprene® EZ-Clean Gaskets, (3) clear coated adjustable shelves per Section, microprocessor controls, 6" adjustable stainless steel legs, NSF, UL, ENERGY STAR®.
 - c. Provide unit with the following:
 - 1) Thermometer side door: hinged on left.
 - 2) Rear door hinged on left.
 - 3) 11 pair Universal tray slides per section.
 - d. Products manufactured by True and Victory, modified to comply with specifications, are acceptable.

100. PASS-THRU REFRIGERATOR
 - a. Traulsen Model No. RHT132WPUT-FHS*C013
 - b. Refrigerator, Pass-thru, one-section, self-contained refrigeration, StayClear™ Condenser, stainless steel exterior and interior, standard depth, wide full-height door or doors with Santoprene® EZ-Clean Gaskets, (3) adjustable wire shelves per Section, microprocessor controls, 6" adjustable stainless steel legs, 1/3 HP, cULus, NSF.
 - c. Provide unit with the following:
 - 1) Thermometer side door: hinged on the right, standard.
 - 2) Rear door hinged on left.
 - 3) 11 pair Universal tray slides, per Section - per section.
 - d. Products manufactured by True and Victory, modified to comply with specifications, are acceptable.

101. SANDWICH WARMER
 - a. Hatco Model No. GR2SDS-24D*C013
 - b. Slant Display Warmer, countertop, (2) shelves with (10) rods, adjustable thermostat, pre-focused infrared top heat, incandescent light, hard-coat aluminum base, tempered glass end panels, designer panels & corner caps, 4" legs, cULus, UL EPH Classified.

- c. Provide unit with the following:
 - 1) Clear Anodized Aluminum housing, finish, standard.
 - 2) Black, designer inset panel color, standard.
 - 3) Black, designer corner cap color.
 - d. Products manufactured by APW/WYOTT and Alto-Shaam, modified to comply with specifications, are acceptable.
102. DROP-IN FROST TOP
- a. Delfield Model No. N8245P*C013
 - b. Drop-In Frost Top, stainless steel 1" elevated top with drain trough & 2" overhang, galvanized steel exterior housing, on/off toggle switch, self-contained refrigeration, R290 refrigerant, 1/5 HP, (44-5/8" x 25" cutout required), cUL, UL, NSF.
 - c. Products manufactured by Atlas and Wells, modified to comply with specifications, are acceptable.
103. SNEEZE GUARD
- a. This item is specified with Item No. 94, Hot Sandwich /Pizza Counter.
104. BEVERAGE REFRIGERATOR
- a. Structural Concepts Model No. CO37R*C013
 - b. Self-Service Refrigerated Case, 36-1/4"W, 79-3/4"H, Breeze-E (Type II) with EnergyWise self-contained refrigeration system, Blue Fin coated coil, (4) non-lit adjustable metal shelves, top light, one-piece formed ABS plastic tub, black interior, (2) full end panels, 4"D removable wall spacer brackets, casters, cETLus, ETL-Sanitation.
 - c. Provide unit with the following:
 - 1) If GFCI is required, a GFCI breaker MUST be used in lieu of a GFCI receptacle.
 - 2) 34" Minimum entry door clearance required (without shipping skid & with rear spacer bracket removed).
 - 3) Breeze-E (Type II) with EnergyWise refrigeration - NSF Type II compliant, standard.
 - 4) Compressor air intake from front & out rear, unit MUST remain 4" from wall & front panel cannot be blocked.
 - 5) Base Support: Casters, with levelers, standard.
 - 6) Interior: Stainless steel, in lieu of standard black.
 - 7) Exterior: Stainless steel.
 - 8) Lower front panel: Stainless steel.
 - 9) Stainless Steel Exterior.
 - 10) Left end panel: Full with mirrored interior, vinyl edging, standard.
 - 11) Right end panel: Full with mirrored interior, vinyl edging, standard.
 - 12) Back Panel: Solid rear swinging door (service RH hinge) with lock.
 - 13) Digital Fahrenheit thermometer, standard.
 - 14) Add Lights (LED) to standard shelves (4).
 - 15) Night curtain: Retractable, non-locking.
 - d. Products manufactured by BSI and Premier, modified to comply with specifications, are acceptable.
105. DROP-IN ICE CREAM FREEZER
- a. Delfield Model No. N227P*C013
 - b. Ice Cream Dipping Cabinet/Freezer, drop-in type, 12-gallon capacity, self-contained, removable cover with handle, stainless steel top, and lid, includes (1) 13" x 25" stainless steel louver, 1/4 HP, (29.62" x 26.62" cutout required), R290

- c. Hydrocarbon refrigerant, UL, NSF.
Products manufactured by Atlas and Perlick, modified to comply with specifications, are acceptable.

106. BEVERAGE REFRIGERATOR

- a. Structural Concepts Model No. CO37R*C013
- b. Self-Service Refrigerated Case, 36-1/4"W, 79-3/4"H, Breeze-E (Type II) with EnergyWise self-contained refrigeration system, Blue Fin coated coil, (4) non-lit adjustable metal shelves, top light, one-piece formed ABS plastic tub, black interior, (2) full end panels, 4"D removable wall spacer brackets, casters, cETLus, ETL-Sanitation
- c. Provide unit with the following:
 - 1) If GFCI is required, a GFCI breaker MUST be used in lieu of a GFCI receptacle.
 - 2) 34" Minimum entry door clearance required (without shipping skid & with rear spacer bracket removed).
 - 3) Breeze-E (Type II) with EnergyWise refrigeration - NSF Type II compliant, standard.
 - 4) Compressor air intake from front & out rear, unit MUST remain 4" from wall & front panel cannot be blocked.
 - 5) Base Support: Casters, with levelers, standard.
 - 6) Interior: Stainless steel, in lieu of standard black.
 - 7) Exterior: Stainless steel.
 - 8) Lower front panel: Stainless steel.
 - 9) Stainless Steel Exterior.
 - 10) Left end panel: Full with mirrored interior, vinyl edging, standard.
 - 11) Right end panel: Full with mirrored interior, vinyl edging, standard.
 - 12) Back Panel: Solid rear swinging door (service RH hinge) with lock.
 - 13) Digital Fahrenheit thermometer, standard.
 - 14) Add Lights (LED) to standard shelves (4).
 - 15) Night curtain: Retractable, non-locking.
- d. Products manufactured by Federal and RPI, modified to comply with specifications, are acceptable.

107. DROP-IN FROST TOP

- a. Delfield Model No. N8245P*C013
- b. Drop-In Frost Top, stainless steel 1" elevated top with drain trough & 2" overhang, galvanized steel exterior housing, on/off toggle switch, self-contained refrigeration, R290 refrigerant, 1/5 HP, (44-5/8" x 25" cutout required), cUL, UL, NSF.
- c. Products manufactured by Atlas and Wells, modified to comply with specifications, are acceptable.

108. SNEEZE GUARD

- a. This item is specified with Item No. 94, Hot Sandwich /Pizza Counter.

109. SPARE NUMBER

110. SPARE NUMBER

111. DROP-IN HOT WELL

- a. Delfield Model No. N8745-D*C013
- b. Drop-In Hot Food Well Unit, Electric, individual pans, wet/dry type with drain & manifold, 3-pan size for 12" x 20" pans, individual infinite temperature controls,

- stainless steel top & wells, galvanized outer liner, (44-5/8" x 25" cutout required), cUL, UL, NSF.
- c. Provide unit with the following:
 - 1) 000-504-0031 Autofill assembly kit.
 - d. Products manufactured by Atlas and Wells, modified to comply with specifications, are acceptable.
112. SNEEZE GUARD
- a. This item is specified with Item No. 94, Hot Sandwich /Pizza Counter.
113. PIZZA WARMER
- a. Hatco Model No. GR2S-48*C013
 - b. Heated Shelf, Designer, Free-standing, built-in adjustable thermostat, hardcoat aluminum top & blanket type foil element, designer exterior panels & corner caps, 4" legs, cULus, UL EPH Classified.
 - c. Provide unit with the following:
 - 1) Black, designer corner cap color.
 - d. Products manufactured by APW/WYOTT and Alto-Shaam, modified to comply with specifications, are acceptable.
114. SNEEZE GUARD
- a. This item is specified with Item No. 94, Hot Sandwich /Pizza Counter.
115. TRAY DISPENSER
- a. Delfield Model No. TT2-1014*C013
 - b. Dispenser, Tray, open frame mobile design, dual self-elevating tray platforms, for 11" x 15" trays, 4" casters, NSF.
 - c. Products manufactured by Colorpoint and Lakeside, modified to comply with specifications, are acceptable.
116. FLATWARE CART
- a. Atlanta Custom Fabricator
 - b. Provide fabricated stainless steel Flatware/Cart, size, and shape, as shown on Drawings. Provide with an open base. Provide stem casters per section 2.2 M2. Front casters to be provided with brakes. Provide cut out for 12" x 20" pan.
 - c. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.
117. REFRIGERATOR
- a. Delfield Model No. GAR2P-S*C013
 - b. Refrigerator, Reach-In, two-section, 46.0 cubic feet capacity, top-mounted self-contained refrigeration system, (2) full-height hinged solid doors (locking), (6) adjustable chrome wire shelves, 4.3" easyTouch® screen temperature display/control with remote monitoring, LED interior lighting, stainless steel exterior front, sides & interior, (4) 5" locking casters, GreenGenius™ R290 Hydrocarbon refrigerant, 0.35 HP, 115v/60/1-ph, 6.0 amps, NEMA 5-15P, NSF, cULus, ENERGY STAR®
 - c. Provide unit with the following:
 - 1) Both doors hinged on left.
 - 2) (6) AS3978333 Additional shelf refrigerator/freezer- chrome (per shelf).
 - 3) Set of (4) 5" locking casters, standard.
 - d. Products manufactured by Beverage-Air and Traulsen, modified to comply with

specifications, are acceptable.

118. EXHAUST HOOD

- a. Gaylord Industries Model No. ELX-GBDAV-AV-62*C013
- b. Each ventilator shall be designed specifically for the cooking equipment being covered. Construction shall be of a minimum 18-gauge, 300 series, #4 finish stainless steel. Top of unit shall be 16 Size and shape per drawings. Hanger brackets, pre-punched on 12" centers, shall run the entire length of the hood, one rear, one front and one center for maximum support and flexibility in installing the hood(s).
- c. The ventilator shall include a stationary grease collecting gutter at the bottom of the grease extraction device, sloped to a drain at one end to a built-in stainless-steel grease drawer. The sloped gutter shall be concealed by an apron which extends the full length of the hood.
- d. The condensate gutter in the front of the ventilator shall be capped and sealed to NSF standards.
- e. Grease extraction shall be by means of Gaylord "XGS" super high efficiency extractors capturing 99% of the grease to between 5 and 7 micron in size. Extractors shall be listed and tested per ASTM F2519, and be easily removable for cleaning by utilizing the provided extractor removal tool.
- f. The ventilator shall include a built-in 3" air space at the rear for compliance to NFPA-96 when mounting against a limited combustible wall. When mounting to a wall also provide side panels to enhance capture performance.
- g. The ventilator shall include a static pressure port in each section to be used in balancing the static pressure. Also included shall be a super capture lip on the front panel for enhancement of smoke and grease capture. Capture testing shall be to UL710 and ASTM 1704.
- h. Provide Gaylord Modulating Dampers. Dampers shall be an opposed blade balancing damper that modulate on command from the DCV-AV Control Center, and accessible from below the hood. The hood shall be listed under the category "Exhaust Hood with Exhaust Damper".
- i. Provide as shown on drawings recessed LED light fixtures. Light fixtures shall be factory pre-wired to a single connection point. Ventilators built in multiple sections shall be furnished with coiled flex conduit for interconnecting sections. Lights shall produce a minimum of 50 foot candle light at any point under the ventilator
- j. Provide complete Ansul R-102 Restaurant Fire Suppression System. Ansul system shall include factory pre-piping of ventilator and field installation of complete system including control cabinet and chemical bottles. System shall comply with UL 1254, 300, NFPA 96 and NFPA 17A. Included in system shall be one balloon test for the state and or local Fire Marshall.
- k. The ventilator shall achieve its low air flow rates without the use of internal motors, plenums or jets. The ventilator shall also include a super capture lip on the front panel for the enhancement of smoke and grease capture.
- l. The ventilator shall include auto start thermostats and controls to meet current IMC codes.
- m. The exhaust hood shall be listed to UL Standard 710 and NSF. The ventilator shall comply with all requirements of NFPA-96, IMC, UMC, BOCA, and SBCCI model Codes.
- n. Provide model C-150/LS hood mount fan start/stop switch and light switch.
- o. Furnish Gaylord Demand Control Ventilation system model DCV-AV-LA-E2M1-HS5-DC-ST-TR to reduce kitchen operational and utility cost by conserving energy through reduction of exhaust and make up air. The system shall be comprised of a wall mounted command center, variable frequency drive(s), modulating dampers

and sensible heat detectors and canopy mounted system over ride. Command center shall include color touch screen HMI digital controls, room ambient sensor, fire suppression integration controls, and VFD interface terminals. Command center shall have learning logic ability to review the previous twenty days activity and program for most efficient air volumes.

- p. Ventilator Items #63 and #118 shall all be serviced from a central exhaust fan, controlled by the DCV-AV Command Center.
 - q. RTDs shall be mounted inside the hood canopy, each RTD shall have programmable temperature adjustments.
 - r. Variable frequency drive(s) shall be provided by Gaylord.
 - s. Scope of work:
 - 1) KEC. Install command center per specified drawing location. Coordinate high and low voltage wiring connections, VFD cabling, any conduit, and wall or ceiling penetrations.
 - 2) Electrical Contractor, coordinated by KEC. Provide dedicated circuit to the command center, RJ45 cable interfacing the controller with individual hood sections, provide electrical service to supply and exhaust fan motors. Each hood section shall require 120v service. Connect low voltage wire between hood sections per wiring schematics. Provide all wiring needed to connect hood fire protection system to the command center. Provide all low voltage cabling from command center to VFDs. Provide all three phase wiring from fans to VFDs. Verify proper fan rotation.
 - 3) Gaylord authorized service agent: Verify all final cable connections are properly installed. Shall perform the complete start up and commissioning of the DCV-AV system. Set all hoods to design air flow. Adjust the VFD set points. Verify complete DCV system functionality. Provide up to three site visits to assist with other trades
 - t. The ventilator(s) shall be started up and final damper adjustments made to ensure operation is within specified air volumes and static pressures. Startup shall be by Gaylord authorized service agent.
 - u. Provide supply air plenum model PBW-17. Plenum box shall be sized per drawing, contain balancing dampers, and be constructed of all type 304 stainless steel. PBW unit shall have mounting brackets the full length of the plenum in front and back, pre punched at 12" intervals for easy mounting to structure above. Unit shall have perforated stainless steel discharge panels.
 - v. Capture and containment per ASHRAE STD 154
 - w. The command center shall be listed to UL 508A, UL 710, and UL 873. Compliant to NSF Standard No. 2
119. ICE MAKER / DISPENSER
- a. Follett Model No. 7CI100A*C013
 - b. Ice & Water Dispenser, countertop, integral air-cooled ice machine, Chewblet® ice, up to 125 lb. production in 24 hours, 7 lb. storage capacity, stainless steel exterior with accent trim, push button dispensing, dispense-activated soft blue light, Agion® silver-based antimicrobial protection, internal filter, drainless design, NSF, cETLus.
120. SPARE NUMBER
121. PIZZA OVEN
- a. Lincoln Foodservice Model No. 1132-000-U DOUBLE*C013
 - b. Conveyor Pizza Oven, electric, front-loading, single-deck, single conveyor belt, glass access window, FastBake™ technology optional, NSF, UL, CSA, 208v/60/3, 28.0

- amps, 10.0 kW.
- c. Provide unit with the following:
 - 1) Each Impinger II Oven includes a start-up checkout performed by a factory-trained authorized service agent .
 - 2) (2) KF006 FastBake™ Kit - left to right.
 - 3) 1120-1 Portable Stand, with casters.
- d. Products manufactured by APW/WYOTT and Turbo Chef, modified to comply with specifications, are acceptable.

122. WORKTABLE

- a. Atlanta Custom Fabricator
- b. Provide fabricated, stainless steel WorkTable, size, and shape, as shown on Drawings. Provide with drawer and undershelf. Reference Sheet Title K801; Foodservice Elevations.
- c. Provide table w/ 4" backsplash and rolled edge on front and ends
- d. Reference to the listing of approved fabricators in Section 2. 2; Fabrication of this specification.

123. HOLDING /PROOFING CABINET

- a. Winston Foodservice Model No. HOV5-14UV*C013
- b. Holding Cabinet, mobile, full-size, insulated, convection holding, accommodates (14) 18" x 26" sheet pans or (28) 13" x 18" sheet pans or (28) 12" x 20" hotel pans, load limit 65 lbs (29.25 kg) per rack, (2) field reversible hinged solid dutch doors, magnetic door handle, C-Touch control with a processor, HACCP temperature downloads, USB & audio ports, manual water fill, stainless steel interior & exterior, NSF, CE, UL, cUL, UL-Sanitation.
- c. Provide unit with the following:
 - 1) Right hand.
 - 2) Locking Door.
 - 3) Window in both upper & lower front doors.
 - 4) 5" Plate casters (2) with locking.
- d. Products manufactured by Metro and Food Warming Equipment, modified to comply with specifications, are acceptable.

124. HAND SINK

- a. Advance Tabco Model No. 7-PS-90*C013
- b. Hand Sink, pedestal mounted base, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, splash mounted faucet, pedal valves with easy access design, basket drain, wall bracket, NSF, cCSAus.
- c. Provide unit with the following:
 - 1) 7-PS-17 Welded Side Splash, 7-3/4 "H (installed height), both sides, splash mounted faucets.
- d. Products manufactured by Eagle and IMC/Teddy, modified to comply with specifications, are acceptable.

125. WALK-IN COOLER

- a. This item is specified in Section 114100 – Food Storage Equipment.

126. WALK-IN COOLER EVAPORATOR COIL

- a. This item is specified in Section 114100 – Food Storage Equipment.

- 127. COOLER CONDENSING UNIT
 - a. This item is specified in Section 114100 – Food Storage Equipment.
- 128. WALK-IN FREEZER
 - a. This item is specified in Section 114100 – Food Storage Equipment.
- 129. WALK-IN FREEZER EVAPORATOR COIL
 - a. This item is specified in Section 114100 – Food Storage Equipment.
- 130. FREEZER EVAPORATOR COIL
 - a. This item is specified in Section 114100 – Food Storage Equipment.

END OF SECTION 114000

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SECTION 11 41 00 – FOOD STORAGE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All work included under this Section is subject to Architect's provisions covering: Invitation to Bid, Proposal Form, Instructions to Bidders, General Conditions, and all other Supplementary General Conditions as may be added.

1.2 SCOPE OF WORK

- A. All equipment specified to be delivered to the job site, uncrated, freight prepaid, assembled, and set in the proper area, where shown on Drawings, ready for final connections, where required, as specified in Divisions 22 00 00 and 26 00 00 and this Section of Contract Documents.

1.3 DESCRIPTION

- A. The extent of the Walk-In Cold Storage and Refrigeration Systems is on the Drawings, Equipment Schedule, and Specifications of this Section of Contract Documents.
- B. The plans indicate the location of the equipment. Slight changes due to the varying dimensions of equipment and wall construction will be permitted with approval by Architect.
- C. This typed Specification will be closely correlated with the Drawings and Schedule. Each complements the other and cross-reference will be necessary to fulfill the requirements of the Specifications. All information shown on Drawings and listed in Schedules will be incorporated as part of the written Specifications.
- D. Conflict in Plans and Specifications where changes, alterations, additions, or deductions are necessary or where exceptions are taken, with regard to sizes, locations, and other details shown on Plans shall be reported in writing for decision by the Architect.
- E. Responsible for seeing that the equipment can be entered through openings before doors and walls are finished.
- F. A competent Walk-In Equipment foreperson shall be on the premises to assist in furnishing information to proper trades-persons on the project and supervising of Walk-In Unit installation under this Section.

1.4 QUALITY ASSURANCE

- A. The Contractor must hold a Cooler/Freezer Pre-Installation Conference with the Owner, Design Profession, Food Service Consultant, Cooler/Freezer installer, and MEP Subcontractors. The agenda is a discussion of the installation schedule, site preparation between trades, and the warranty period.
- B. Contractors must perform on-site quality control (QC) inspections during and immediately after installation of cooler / freezer and provide the Owner with a report. The Contractor is responsible for identifying all areas of potential leaks; identify all penetrations and ensure that all penetrations are properly sealed; ensure controls work properly; ensure doors and air curtains function properly, provide QC inspection to the Owner and DP of the penetration inspection report and results of a thermal scan of the interior of the cooler and freezer.

- C. Permits and Certificates: All laws, codes, ordinances, and regulations bearing on the conduct of the work as drawn and specified to comply, and will give all notices required. Any work upon which an Inspection Certificate by local authorities and any governing body is required, such as Inspections certificate or certificates will be obtained and be paid for.
- D. All accessories shall be provided, whether specified or not, with equipment to comply with all governing codes.
- E. Class, I Panel: Manufacturer of pre-fabricated Walk-In Unit shall provide the unit with approved Class I Panels. Approved Manufacturer complying with Class 1 panel construction is Thermokool, American Panel, and Kolpak. Compliance with this test includes a full corner testing of the Manufacturer's constructed panels.
- F. Walk-In Unit manufacturer complying with Paragraph 1.4, C, will submit Sample of Panel certification with submittals for verification.
- G. Walk-In manufacturer will have received UL Seal of Approval and Factory Mutual's test approval for low CFC foam construction, and Manufacturer will submit a sample of approved Certificates for verification.

1.5 REFERENCES

- A. The Drawings indicate the desired necessary arrangement and dimensions of the equipment. Minor deviations may be substituted for approval provided basic requirements are met, and no major rearrangement of service to the equipment is required to affect the proposed alteration; such deviations will be made without expense to the Owner.
- B. At no expense to the Architect or Owner, Operational and functional tests of the installed equipment is required. Defects or deficiencies noted as a result of tests will be corrected to the satisfaction. Consult the Mechanical and Electrical connections Drawings and their accompanying specifications to determine additional requirements for the installation of the specified unit.
- C. Verify with Mechanical and Electrical plans for electrical voltages, cycles, phases, and special requirements before ordering equipment.

1.6 SUBMITTALS

- A. Specifications Section 114000 – Foodservice Equipment, Part 1; 1.7 Submittals.

1.7 HANDLING AND STORAGE

- A. Protect metal finishes from damage during shipping, storage, handling, installation, and construction of other work in the same spaces. Wrap and crate each item of equipment as needed for protection from damage.
- B. Cover exposed stainless steel surfaces with self-adhesive protective paper of a type recommended by the metal manufacturer, and do not remove until work is installed and ready for cleaning and start-up.

1.8 SCHEDULING

- A. Schedules and Reports: Establish the earliest and latest job site delivery dates of Owner furnished and Contractor installed items.

1.9 WARRANTIES

- A. Walk-In Cooler/Freezer Unit will be guaranteed for ten years after the final approval of Architect, against poor workmanship and defective materials. Any defect within this period will be corrected at no charge to the Owner.
- B. Compressors and coils will have a 1-year free service on parts and labor warranty and guarantee, and an additional 4-year warranty on the compressors.
 - 1. On extended compressor warranty, only labor charges after the first year shall be paid.
- C. Assign extended warranties to Owners at the end of the first year, on all equipment having more than one year warranty from Manufacturer.

PART 2 - PRODUCTS

2.1 WALK-IN COOLER/FREEZER UNIT

- A. Furnish pre-fabricated, NSF approved metal-clad Walk-In Cooler/Freezer Units manufactured by Thermokool. Size and shape, as shown on Drawings. Unit to be 9' -6" high.
- B. As shown on Drawings, the Cooler/Freezer Unit shall be partitioned into compartments, size, and shape as designed.

2.2 MATERIALS

- A. Walk-In floors:
 - 1. Walk-in Cooler/Freezer floor is to be installed on the floor in the kitchen, as detailed on Drawings. Floor to be Porcelain Tile. Provide an interior ramp. Reference Sheet Title K703; Foodservice Standards.
- B. Insulation shall be of 4-inch thick "Foamed-In-Place" polyurethane. The door will have the same type of insulation.
- C. Exterior shall be of .040-gauge pebble embossed aluminum. Where units are adjacent to walls or columns, there shall be provided a matching trim to close spaces between the wall(s) and unit. All crevices are to be sealed with clear polysulfide sealant. Furnish a matching panel to fasten area between the top of unit and ceiling with a removable access panel for required maintenance service on top of the unit.
- D. Interior walls and ceiling will be of .40 gauge pebble embossed aluminum. Ceiling to be finished with baked white polyester on panels.
- E. Door:
 - 1. The door will be silliness-in fitting type or flush-mounted. Door to be metal clad with 22 gauge Type 304 stainless steel, with smooth corner seams. The bottom edge to contain an adjustable rubber wiper gasket. The door will have heater cables in the door jamb to prevent condensation and frost formation. The door hinge will be the self-closing type with lift-cam hinges. The door will be provided with safety release inside latch. Door to be supplied with hardware for locking with a padlock. Doorjamb and outer door edge surfaces shall be constructed of stainless steel. Plastic composition material shall not be accepted.
 - 2. Provide at each three-hinged Door, one set of polyester reinforced swinging doors, Model No. PP-C-080-3678, manufactured of clear extruded vinyl with rounded edges, manufactured by Curtron Products a Division of TMI, LLC. Products manufactured by Kason, modified to comply with specifications, are acceptable. The curtains shall be

- suitable for applications with temperatures as low as -40 degree F and shall be made to properly fit over entrance door opening. Swinging doors shall be supported on sides of the door opening with mounting hardware on the inside of sections.
3. Provide 14 x 14 inch heated triple-pane observation window type with closed air spaces between panes. Windows shall be removable for easy replacement. Each door shall be provided with an observation window.
 4. Provide a door with an adjustable hydraulic door closer. Mount door closer on the exterior side of the door. Adjust the closing speed at installation as required.
- F. Gaskets: All panel sections to be furnished with PVC compression gaskets. Tape or plain sealant not acceptable.
- G. Lights will be LED type and provided with a break-proof and shatterproof guard. Provide each Section with flush-mounted light switches on the outside of Section.
1. The light fixture shall be Model LED48X62221N, manufactured by Component Hardware. Light fixtures shall be UL listed for wet and damp areas. UL listings dated 1991. Light fixtures manufactured by Lithonia Lighting, Hubbell Lighting, Inc, and Kason, which comply with specifications, are acceptable.
 2. The fixture will be capable of withstanding temperatures as low as -40 degree F and be provided with shatterproof enclosure cover. Provide the following quantities.
 - a. Cooler: Four fixtures, plus standard light over the door.
 - b. Freezer: Four fixture plus, standard light over the door.
 3. Occupancy sensor motion detection light switch
- H. Thermometer to be a minimum of 2-1/2 inch diameter and flush-mounted on outside of each Section and have rust-resistant case.
1. Walk-In Cooler with a digital thermometer (also include a non-digital thermometer at the exterior of cooler with probe to center of cooler).
 2. Walk-In Freezer with a digital thermometer (also include a non-digital thermometer at the exterior of freezer with probe to center of freezer).
 3. Walk-.
- ### 2.3 CONDENSER AND EVAPORATOR UNIT
- A. The length of the refrigeration line runs between each condensing unit and evaporator coil to be verified and confirmed with Manufacturer before installation.
- B. Provide unit with at least the following components:
1. Heavy-gauge housing for outside use.
 2. Scroll motor compressor for Cooler Section with built-in overload protection.
 3. Scroll motor compressors for Freezer Section with built-in overload protection.
 4. Aluminum-finned, copper tube air-cooled condenser with direct driven condenser fan, arranged for horizontal airflow.
 5. Refrigerant receiver with inlet, outlet, purge, relief and charging valves.
 6. Suction and discharge line vibration eliminators.
 7. Defrost controls.
 8. Low-ambient pressure and starting controls.
 9. Safety operating controls.
- C. Safety controls will include:
1. High pressure cut-out with manual reset.
 2. Magnetic control for the motor-compressor with ambient compensated manual reset

- overloads.
 3. Operating control to be automatic recycling, low-pressure cut-out switch. A low ambient control system will be fully automated, and will not require auxiliary heat or heated receivers.
 4. Each Section is to be provided with a high-temperature alarm. Each alarm is to have a dry contact for wiring to a central or remote control point.
 5. Walk-In Cooler & Freezer shall be connected to the Intrusion Alarm. Cooler functions shall be monitored by the building control system; program the system to send an email notification to the Maintenance and School Nutrition Department. No other control system is acceptable.
- D. Defrost of all freezer evaporator coil surfaces, drain pans and drain lines will be by electric defrost systems. Defrost to be controlled by timer mounted at each condensing unit.
- E. Each evaporator Unit to be supported on a metal angle iron frame constructed as part of the condensing unit. Propeller-fan, free delivery type, arranged for horizontal airflow. The evaporator coil will be of copper tube, aluminum-finned constructions housed in a heavy-gauge aluminum casing.
1. Walk-In Cooler: BEL0095AS6AMA/BCH0025MCACZ
 2. Walk-In Freezer: BEL0100BS6EEA/BCH0060DACZ
- F. The balanced Refrigeration Systems for the specified Walk-In Unit's Sections will be capable of maintaining the required temperature for each Section as follows:
1. Cooler 34 degree F to 38 degrees F
 2. Freezer -10 degree F to 0 degrees F
- G. Reference Drawing sheet QF601 for Electrical Service.
- H. Specialty Items:
1. Provide a system with the following Specialty Items:
 - a. Refrigerant sight glass and moisture indicator.
 - b. Hermetically-sealed refrigerant-filter dehydrator.
 - c. Liquid solenoid valve.
 - d. Thermostatic expansion valve.
 - e. Heat exchanger.
 - f. Suction strainer and Armaflex insulation for suction line - complete.
 2. Condensate drain lines shall be of Type "L" copper tubing in Walk-In Unit, and directed to outside of the unit, into Floor Drain, where shown on Drawings. Provide condensate drain lines directed to the lowest possible level. Wrap all condensate drain lines in the freezer section with electrically heated cable tape.
 3. Run pipes through walls and ceiling panels in sleeves. All refrigerator sleeves shall be furnished as part of the installation. All plugs and cut-outs shall be fully resealed.
 4. A thermostat will control temperatures in refrigerated rooms mounted at each evaporator unit to close the liquid solenoid valve on a fall in room temperature, for automatic recycling pump-down and shut off of the condensing unit. The thermostat and solenoid valve circuit shall be connected to terminals in the evaporator unit casing.
- I. The refrigeration system of the walk-in cooler/freezer will be equipped with a Eco-Smart demand frost electronic control system mounted to the evaporator coils. The system will be custom-designed for the walk-in coolers and freezer to control an electric expansion valve in response to evaporator superheat and return air temperature
- J. No power wiring is required between evaporator coils.

- K. Demand defrost will be the default method for the system for freezers, off-cycle will be the default defrost method for coolers.
- L. The room temperature range will be -40°F to 80°F. Medium temperature application is pre-set at 35°F cut-out with air defrost. Low-temperature application is pre-set at -10°F cut-out room temperature with demand and defrost. The cut-in temperature differential is 5°F by default. These setpoints can be field set at the job site if different settings are desired.
- M. Approved Alternates: Heatcraft, KE2 Therm, and Master-Bilts Master Controller

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide on-site operational and functional testing of specified equipment. Testing and initial operation of this equipment will be supervised by a qualified representative of the balanced refrigeration system manufacturer. Defects or deficiencies will be corrected to the satisfaction of the Architect or Owner at the expense of the Contractor.
- B. Certificate shall be filed with Architects certifying that equipment is operating based on Manufacturer's recommendations. Coordinate the performance of these services, and both the Manufacturer's representative and Contractor shall sign certificate.
- C. On completion of installation and testing, remove all packaging and debris from the site, clean all items of equipment as recommended by Manufacturer and leave equipment ready for use by Owner.
- D. Refrigeration Systems package shall be set on a pad located where shown on Architectural Drawings. Verify location from Drawings.
- E. Provide junction boxes, one for each unit section, as shown on Drawings to connect service for lights and heater cable. Project Electrician will make connections from electric panels to control panel on compressors and to respective junction boxes.
- F. Provide control wiring between evaporator units, compressor units, and related control items. All wiring shall be run in EMT (Electric Metallic Tubing). All wiring will be of type TW copper. Wiring and conduits sizing shall conform to the requirement of The State of South Carolina Electric Code. All conduits inside of units shall be of the "Seal-Tite" type.
- G. Conduits, wiring, and refrigerant lines will be concealed within walls, ceilings, and floors of the building.

END OF SECTION

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SECTION 11 52 13 - PROJECTION SCREENS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Electrically operated, surface mount, projection screen and controls.

1.2 DEFINITIONS

- A. Gain: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.
- B. Half-Gain Angle: The angle, measured from the axis of the screen surface to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show layouts and types of front-projection screens. Include the following:
 - 1. Drop lengths.
 - 2. Anchorage details, including connection to supporting structure for suspended units.
 - 3. Details of juncture of exposed surfaces with adjacent finishes.
 - 4. Location of wiring connections for electrically operated units.
 - 5. Wiring diagrams for electrically operated units.
 - 6. Accessories.

1.4 CLOSEOUT SUBMITTALS

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

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Environmental Limitations: Do not deliver or install projection screen until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.6 COORDINATION

- A. Coordinate layout and installation of projection screens with adjacent construction, including ceiling suspension systems, light fixtures, HVAC equipment, fire-suppression system, and partitions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Projection Screen: Obtain accessories, including necessary mounting hardware, from screen manufacturer.

2.2 ELECTRICALLY OPERATED, FRONT-PROJECTION SCREENS

- A. General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Controls: Remote, key-operated, three-position control switch installed in recessed device box with flush cover plate matching other electrical device cover plates in room where switch is installed.
 - a. Provide key-operated, power-supply switch.
 - b. Provide video interface control for connecting to projector. Projector provides signal to raise or lower screen.
 - 3. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
 - 4. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a **3/8-inch- (9.5-mm-)** diameter metal rod with ends of rod protected by plastic caps, recessed in ceiling.
 - a. Roller for end-mounted motor is supported by self-aligning bearings in brackets.
 - b. Roller for motor in roller is supported by vibration- and noise-absorbing supports.
 - 5. Tab Tensioning: Provide units that have a durable low-stretch cord, such as braided polyester, on each side of screen that is connected to edge of screen by tabs to pull screen flat horizontally.
- B. Surface Mounted, Metal-Encased, Electrically Operated Screens with Tab Tensioning: Motor-in-roller units designed and fabricated for surface mounting, fabricated from formed-steel sheet not less than **0.027 inch (0.7 mm)** thick or from aluminum extrusions; baked-enamel finish. Provide with matching end caps and concealed mounting.
 - 1. **Basis-of-Design Product:** Subject to compliance with requirements, provide **Draper Inc.;** Access XL/Series V or a comparable product by one of the following:
 - a. Da-Lite Screen Company.

- b. Stewart Filmscreen Corporation.

2.3 FRONT-PROJECTION SCREEN MATERIAL

- A. Matte-White Viewing Surface: Peak gain of not less than 0.9, and gain of not less than 0.8 at an angle of 50 degrees from the axis of the screen surface.
 - 1. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Draper Inc.](#); 101794 for Front Projection or a comparable product by one of the following:
 - a. Da-Lite Screen Company.
 - b. Stewart Filmscreen Corporation.
- B. Material: Matt White XT1000VB for front Projection.
- C. Mildew-Resistance Rating: Zero or 1 when tested according to ASTM G 21.
- D. Flame-Spread Index: Not greater than 75 when tested according to ASTM E 84.
- E. Seams: Where length of screen indicated exceeds maximum length produced without seams in material specified, provide screen with horizontal seam placed as follows:
 - 1. At top of screen at juncture between extra drop length and viewing surface.
- F. Seamless Construction: Provide screens, in sizes indicated, without seams.
- G. Edge Treatment: Black masking borders.
- H. Size of Viewing Surface: 96" Wide by 60" (113" diagonal image area).
- I. Image Format: 16:10.
- J. Controls: 3-position key control Switch KS-3.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install projection screen at location indicated in Cafeteria to comply with screen manufacturer's written instructions.
- B. Install front-projection screen with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
 - 1. Test electrically operated units to verify that screen controls, limit switches, closures, and other operating components are in optimum functioning condition.

END OF SECTION 11 52 13

SECTION 12 21 13 – HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Horizontal louver blinds with aluminum slats.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For each type and color of horizontal louver blind.
 - 1. Include Samples of accessories involving color selection.
- C. Samples for Verification: For each type and color of horizontal louver blind indicated.
 - 1. Slat: Not less than 12 inches (300 mm) long.
 - 2. Valance: Full-size unit, not less than 12 inches (300 mm) wide.
- D. Product Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.4 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.

1.5 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hunter Douglas Contract.
2. Levolor Contract; a Newell Rubbermaid company: Basis of Design.
3. Springs Window Fashions; SWFcontract.

- 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 (25 mm).
2. Thickness: Not less than 0.008 inch (0.20 mm).
3. Spacing: Manufacturer's standard.
4. Finish: Ionized antistatic, dust-repellent, baked polyester finish.
5. Features:
 - a. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.

- C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.

NOTE: Headrail to follow shape of window.

1. Capacity: One blind(s) per headrail unless otherwise indicated.
2. Ends: Manufacturer's standard.
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. Tilt: Two-direction, positive stop or lockout limited at an angle of 80 degrees from horizontal, both directions.
 - c. Operator: Clear-plastic wand.
 - d. 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 (1219 mm) above floor level when blind is fully closed.

6. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard unless otherwise indicated.
- 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. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
 1. Type: End.
- H. 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 (23 deg C)**:
 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less **1/4 inch (6 mm)** per side or **1/2 inch (13 mm)** total, plus or minus **1/8 inch (3.1 mm)**. Length equal to head-to-sill dimension of opening in which blind is installed less **1/4 inch (6 mm)**, plus or minus **1/8 inch (3.1 mm)**.
- 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. Install horizontal louver blinds at all exterior windows (NSL).
 2. Locate so exterior slat edges are not closer than **1 inch (25 mm)** from interior faces of glass and not closer than **1/2 inch (13 mm)** from interior faces of glazing frames through full operating ranges of blinds.
 3. Install mounting and intermediate brackets to prevent deflection of headrails.
 4. 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 Material Completion.
- C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Material Completion.

END OF SECTION 12 21 13

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Motorized window shades, including electric operators and accessories.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
 - 1. Motorized Shade Operators: Include operating instructions.
 - 2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: Show location and extent of shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mounting details for shades and for motors, attachments to other Work, operational clearances, and relationship to adjoining work.
 - 1. Motorized Shade Operators: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions. Include rough-in coordination drawings.
 - 2. Wiring Diagrams: Power, system, and control wiring.
- C. Samples for Initial Selection: For each colored component of each type of shade indicated.
 - 1. Include similar Samples of accessories involving color selection.
- D. Samples for Verification:
 - 1. For the following products:
 - a. Shade Material: Not less than 12-inch- square section of each fabric, from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark face of material.
- E. Window Treatment Schedule: Include shades in schedule using same room designations indicated on Drawings.
- F. Product Certificates: For each type of shade product, signed by product manufacturer.
- G. Product Test Reports: For each type of shade and accessory product.
- H. Manufacturer's installation and maintenance instructions.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain shades through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide shades with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency:
 - 1. Flame-Resistance Ratings: Passes NFPA 701.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Product Standard: Provide roller shades complying with WCMA A 100.1.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, and location of installation using same room designations indicated on Drawings and in a window treatment schedule.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where shades 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 operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Shades: Before installation begins, for each size, color, texture, and pattern indicated, full-size units equal to 5 percent of amount installed, but not fewer than 1 full-size units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Roller Shades: Subject to compliance with requirements, provide the Basis-of-Design product indicated, or comparable product approved by Architect from one of the following:
 - 1. Draper, Inc.
 - 2. MechoShade Systems, Inc.
 - 3. Hunter Douglas, Inc.; Hunter Douglas Architectural.
 - 4. Lutron Shading Solutions by VIMCO.
- B. Motorized Shade Operators: Subject to compliance with requirements, provide Lutron Sivoia QED operator or comparable product approved by Architect from one of the following:
 - 1. Elero USA Inc.
 - 2. Lutron Electronics Company.
 - 3. SIMU US, Inc.
 - 4. SOMFY Systems.
 - 5. Shade operators may also be provided by approved manufacturer of roller shade.

2.2 ROLLER SHADES

- A. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with manufacturer's standard method for attaching shade material.
- B. Direction of Roll: Regular, from back of roller.
- C. Mounting Brackets: Fascia end caps, fabricated from steel finished to match fascia.
- D. Fascia: 6-1/2 inch by 6-1/2 inch aluminum extrusion, 0.125 inch minimum wall thickness, to conceal shade roller and hardware.
 - 1. Type: Square, with endcaps.

- 2. Finish: Silver powder coat.
- E. Bottom Bar: Steel or extruded aluminum. Provide exposed-to-view, external-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
- F. Shade Operation:
 - 1. Motorized operator.
- G. Mounting: Mounted inside window opening and extending from head to sill and jamb to jamb, and as indicated on Drawings, mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.

2.3 SHADE FABRIC

- A. Shade Band Material, typical installation, unless noted otherwise: PVC-coated polyester or PVC-coated fiberglass and polyester blends.
 - 1. Colors: As selected by Architect from manufacturer's full range
 - 2. Material Openness Factor: 3 percent.
 - 3. Bottom Hem: Straight.

2.4 SHADE FABRICATION

- A. Product Description: Roller shades each consisting of fabric, rails, ladders, lifting mechanism, self-leveling device, and installation hardware.
- B. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
 - 1. Lifting Mechanism: With permanently lubricated moving parts.
- C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
- D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting headrail, valance, and operating hardware and for hardware position and shade mounting method indicated.
- E. Installation Fasteners: Not fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

2.5 MOTORIZED SHADE OPERATORS

- A. General: Provide factory-assembled shade operation systems designed for lifting shades of type, size, weight, construction, use, and operation frequency indicated. Provide operation systems of size and capacity and with features, characteristics, and accessories suitable for Project conditions and recommended by shade manufacturer, complete with electric motors and factory-prewired motor controls, power disconnect switches, enclosures protecting controls and all operating parts, headrail, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with the building electrical system.
- B. Comply with NFPA 70.
- C. Electric Motors: UL-approved or -recognized, totally enclosed, insulated motor, complying with NEMA MG 1, with thermal overload protection and adjustable limit switches; sized by shade manufacturer to start and operate size and weight of shade considering service factor or considering Project's service conditions without exceeding nameplate ratings.
 - 1. Service Factor: According to NEMA MG 1, unless otherwise indicated.

2. Motor Characteristics: Single phase, 110 V, 60 Hz.
3. Motor Mounting: Within manufacturer's standard headrail enclosure.
- D. Controls: All shades in each space shall be controlled by a single switch to operate as one group. Provide all components for group control as recommended by shade manufacturer for operation. Basis-of-Design is Draper IntelliFlex Controls, including, but not be limited to, the following components:
 1. Control Stations: Shall be a specification grade 120V, 15 amp, 3-position toggle switch, UL and CSA recognized. Switch shall be a single-pole, double-throw, maintained contact, device color as selected by Architect. Provide switch with custom engraved stainless steel cover plate identifying control purpose and operation.
 2. Group controller: Subject to compliance with requirements, provide Draper IntelliFlex GC-4, quantity as recommended by manufacturer for control of shades in each space, as determined by the Architect and shall have two standard operating modes: Normal Mode allowing the shades to be stopped anywhere in the window's opening height and Uniform Mode allowing the shades to only be stopped at the predefined intermediate stop positions. Both modes shall allow for all up/all down positioning.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Field verify window dimensions prior to fabrication.
- B. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.
- C. Coordinate requirements for power supply, conduit, and wiring required for window shade motors and controls.
- D. Prior to installation, verify type and location of power supply.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 SHADE INSTALLATION

- A. Comply with shade manufacturer's written instructions and approved shop drawings.
- B. Install shades level and plumb, according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Install intermediate support as required to prevent deflection in headrail. Allow clearances for window operation hardware.
- C. Install fascia endcaps to conceal roller and operating mechanism. Do not use exposed fasteners.
- D. Connections: Connect motorized operators to building electrical system.
- E. Provide shades at exterior windows in the following spaces:
 1. Cafeteria: Sun-screen shades at windows on north wall, above and beside delayed egress doors, west wall. Do not cover doors.
 2. Cafeteria: Room Darkening at east wall. Do not cover doors.
- F. All shades shall match field verified opening of window.

3.4 ADJUSTING

- A. Adjust and balance shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- B. Test motorized window shades to verify that controls, limit switches, and other operating components are functional. Correct deficiencies.

3.5 CLEANING AND PROTECTION

- A. Clean shade 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 ensure that shades are without damage or deterioration at time of Material Completion.
- C. Replace damaged shades that cannot be repaired, in a manner approved by Architect, before time of Material Completion.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain systems. Refer to Division 01 Section "Closeout Procedures."

END OF SECTION 12 24 13

SECTION 12 61 00 - FIXED AUDIENCE SEATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fixed audience seating with the following:
 - 1. Floor mounted chairs.
 - 2. Plastic chairs with upholstered inserts in seat and back, hard armrests, no tablets.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of components, and finishes for fixed audience seating.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Seating Layout: Show seating layout, aisle widths, aisle-end alignment or stepping, row-lettering scheme, chair widths, and chair spacing in each row.
- C. Samples for Initial Selection: For each type of exposed color, finish, texture, and pattern indicated.
 - 1. Include Samples of accessories involving color and finish selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Plastic: Manufacturer's standard-size unit, not less than **3 inches (75 mm)** square.
 - 2. Baked-on Coating Finishes: Manufacturer's standard-size unit, not less than **3 inches (75 mm)** square.
 - 3. Upholstery Fabric: Fabric manufacturers standard sample of fabric from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
 - 4. Row-Letter Plates: Full-size unit with letters and numbers marked.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of fixed audience seating.
- B. Field quality-control reports.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fixed audience seating to include in operation and maintenance manuals.
 - 1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
 - a. Methods for maintaining upholstery fabric.
 - b. Precautions for cleaning materials and methods that could be detrimental to seating finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from the same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Chair Seats and Backs: 2 percent of quantity installed for each type and size of chair seat and back.
 - 2. Chair Seat Hinges (torsion springs): 5 percent of quantity installed.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of fixed audience seating that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including standards, beams, and pedestals.
 - b. Wear and deterioration of stitching beyond normal use.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Periods: As follows, from date of Material Completion.
 - a. Structural: Five years.
 - b. Operating Mechanisms: Five years.
 - c. Plastic and Paint Components: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain each type of seating required, including accessories and mounting components, from single source from single manufacturer.
 - 1. Upholstery Fabric: Obtain fabric of a single dye lot for each color and pattern of fabric required.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics of Upholstered Chairs:
 - 1. Fabric: Class 1 according to DOC CS 191-1953 or 16 CFR 1610, tested according to California Technical Bulletin 117.
 - 2. Padding: Comply with California Technical Bulletin 117.

3. Full-Scale Fire Test: Comply with California Technical Bulletin 133.

B. Strength and Durability Performance: Chairs and components shall pass testing according to BIFMA X5.4.

2.3 FIXED AUDIENCE SEATING

A. Fixed Audience Seating: Assembly-space seating in permanent arrangement as shown on Drawings.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Hussey Seating Company **Fusion™ Quattro Classic**, contact Chris Brown, Southeastern Services and Equipment, 678-906-0827; or comparable a product modified to match the Basis of Designs by one of the following:

- a. KI, ~~Concerto Auditorium Chair Lancaster~~ with 16-degree back incline, Rick Baitinger, 404-655-03483.
- b. Irwin Seating Company, Citation, Tripp Copeland 404-580-7659.

B. Chair Stanchions: Flat floor; floor mount, manufacturer's standard construction:

1. Aluminum die cast from Aluminum Alloy 380 with polyester powder coat finish.

C. Fabric Upholstered Chairs: Fabric: To be selected from manufacturer's full offering, no vinyl.

D. Back:

- a. Padding Insert Thickness: Manufacturers standard.
- b. Outer Back Surface: Molded plastic.
- c. Top Corners: Rounded.
- d. Upholstery Options: Manufacturers standard construction.

E. Seat:

- a. Padding Insert Thickness: Manufacturers standard.
- b. Seat Bottom: Molded-plastic shell.
- c. Upholstery Option: Match back insert.

F. Chair Width: Minimum chair width of 21-inches and 22-inches as shown on the Drawings.

G. Back Height: Standard-style backs, manufacturer's standard height, 32-inches from floor.

H. Back Pitch: Fixed, no 90-degree fixed back pitch.

1. Back Angle: As shown on the Drawings; 16-degrees or as necessary to maintain correct aisle spacing of 36-inches clear.

I. Chair Seat Hinges: Self-lubricating, with noiseless self-rising seat mechanism passing ASTM F 851, positive internal stops cushioned with rubber or neoprene, and requiring no maintenance.

1. Self-Rising Seat Mechanism: Torsion Springs, full fold **or gravity lift seat return to full-fold position.**

J. Row-Letter Plates: Manufacturer's standard.

1. Material: Lexan with black silk-screened letters.
2. Location: Row letter on top of back of chair.
3. Attachment: Manufacturer's standard method.

2.4 MATERIALS AND FINISHES

- A. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
- B. Concealed Plywood: HPVA HP-1 hardwood plywood or DOC PS 1 softwood plywood as standard with manufacturer.
- C. Molded Plastic: High-density polyethylene or polypropylene, blow or injection molded, with surface that is mar and dent resistant.
 - 1. Provide with UV inhibitors to retard fading.
 - 2. Color and Texture: As selected by Architect from manufacturer's full range.
- A. Fabric: To be selected from manufacturer's full offering.
- B. Upholstery Padding: Flexible, cellular, molded or slab polyurethane foam.
- C. Metal Finish: Finish exposed metal parts with manufacturer's standard baked-on powder coating.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.5 FABRICATION

- A. Floor Attachments: Fabricate to conform to floor slope so that standards and pedestals are plumb and chairs are maintained at same angular relationship to vertical throughout Project.
- B. Upholstery: Fabricate fabric-covered cushions with molded padding beneath fabric and with fabric covering free of welts, creases, stretch lines, and wrinkles. For each upholstered component, install pile and pattern run in a consistent direction.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Install seating in locations indicated and fasten securely to substrates according to manufacturer's written installation instructions.
 - 1. Install fixed audience seating with each chair capable of complying with performance requirements without failure or other conditions that might impair the chair's usefulness.
 - 2. Install standards and pedestals plumb.
 - 3. Install seating so moving components operate smoothly and quietly.
- B. Install seating with end standards aligned from first to last row and with backs and seats varied in width and spacing to optimize sightlines as shown on the Drawings.

- C. Install chairs in straight rows matches the existing.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Inspect components, assemblies, and equipment, including connections, to verify proper, complete, and sturdy installation according to manufacturer's written instructions and product specifications.
 - 2. Verify that seats return to correct and uniform at-rest position.
- B. Fixed audience seating will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust chair backs so that they are at proper angles and aligned with each other in uniform rows.
- B. Adjust hardware and moving parts to function smoothly so they operate easily. Lubricate bearings and sliding parts as recommended in writing by manufacturer.
- C. Adjust self-rising seat mechanisms so seats in each row are aligned when in upright position.
- D. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.
- E. Replace damaged and malfunctioning components that cannot be acceptably repaired.
- F. Replace upholstery fabric damaged during installation or work of other trades.

END OF SECTION 12 61 00

