

Project Manual

Construction Documents

Sedalia Central Office Relocation

1712 South Lafayette Avenue, Sedalia, Missouri 65301

Prepared For:

Sedalia School District 200

2806 Matthew Drive

Sedalia, Missouri 65301

HM Project No: 23195

Issue Date: April 11, 2025

Prepared By:

Hollis + Miller Architects

1828 Walnut Street, Suite 922

Kansas City, Missouri 64108

816.422.7700

Contents:

Volume 1: Introductory Information, Bidding and Contracting Requirements, Division 1 through Division 12.

Volume 2: Division 21 through Division 33.





SECTION 000101 - PROJECT TEAM DIRECTORY

PART 1 - GENERAL

1.1 PROJECT TEAM INFORMATION

A. PROJECT:

1. Project Number and Name:
 - a. Name: Sedalia Central Office Relocation
 - b. Location: 1712 S. Lafayette Ave., Sedalia, Missouri 65301
 - c. Project No: 23195

B. OWNER:

1. Name: Sedalia School District 200
2. Address: 2806 Matthew Drive, Sedalia, Missouri 65301
3. Phone: 660.829.6450
4. Contact: Chris Pyle
 - a. Email: pylec@sedalia200.org

C. ARCHITECT:

1. Name: Hollis + Miller Architects, Inc.
2. Address: 1828 Walnut Street, Suite 922, Kansas City, MO 64108.
3. Phone: 816.442.7700 / Fax: 816.599.2545
4. Contact: Philip Korthanke
 - a. Email: pkorthanke@hollisandmiller.com

D. CIVIL ENGINEER:

1. Name: MKEC Engineering, Inc.
2. Address: 11827 W 112th Street, Suite 200, Overland Park, Kansas 66210.
3. Phone: 913.317.9390.
4. Contact: Braden Taylor
 - a. Email: btaylor@mkec.com

E. STRUCTURAL ENGINEER:

1. Name: Stand Structural Engineering Inc.
2. Address: 8234 Robinson Street, Overland Park, KS 66204
3. Phone: 913.214.2169
4. Contact: John Funk
 - a. Email: jfunk@stand-sei.com

F. MEP ENGINEER:

1. Name: True Engineering
2. Address: 1200 E. Woodhurst Drive, Bldg P, Springfield, Missouri 65804
3. Phone: 913.214.2169
4. Contact: Jacob Nelson
 - a. Email: nelson@true-mep.com

G. TECHNOLOGY/AV CONSULTANTS:

1. Name: Progressive Electronics
2. Address: 6102 Arlington Ave, Raytown, Missouri 64133
3. Phone: 816.765.5750
4. Contact: Nathan York
 - a. Email: nyork@peikc.com

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 000101

SECTION 000105 - CERTIFICATIONS PAGE

ARCHITECT

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 1 SECTIONS:	011000, 012100, 012200, 012300, 012500, 012501, 012600, 012900, 013100, 013200, 013233, 013300, 014000, 014200, 014529, 015000, 016000, 017300, 017419, 017700, 017823, 017839, 017900.
DIVISION 2 SECTION:	024119.
DIVISION 4 SECTIONS:	040100, 042000.
DIVISION 5 SECTION:	055000.
DIVISION 6 SECTIONS:	061000, 061600, 064023, 066400.
DIVISION 7 SECTIONS:	071326, 072100, 072500, 072726, 074216, 074400, 074263, 074800, 075423, 076200, 078413, 078446, 079200, 079500.
DIVISION 8 SECTIONS:	081113, 081416, 083323, 084113, 085613, 087100, 088000.
DIVISION 9 SECTIONS:	092116, 092900, 093000, 095113, 095433, 096513, 096519, 096723, 096813, 097700, 099113, 099123, 099600.
DIVISION 10 SECTIONS:	101100, 101400, 101423, 102113, 102600, 102800, 104413, 104416.
DIVISION 12 SECTIONS:	122413, 123200, 123666.

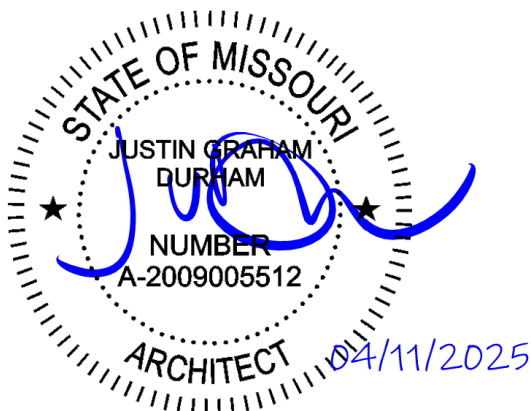
I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.

JUSTIN DURHAM

APRIL 11, 2025

ARCHITECT

DATE



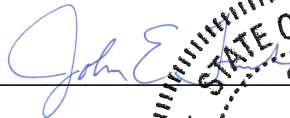
SECTION 000105 - CERTIFICATIONS PAGE


ENGINEER

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 1 SECTIONS:	
DIVISION 2 SECTIONS:	
DIVISION 3 SECTIONS:	032000, 03300
DIVISION 4 SECTIONS:	042200
DIVISION 5 SECTIONS:	051200, 053100
DIVISION 6 SECTIONS:	
DIVISION 7 SECTIONS:	
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DIVISION 11 SECTIONS:	
DIVISION 12 SECTIONS:	
DIVISION 13 SECTIONS:	
DIVISION 14 SECTIONS:	
DIVISION 31 SECTIONS:	
DIVISION 32 SECTIONS:	
DIVISION 33 SECTIONS:	

I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.


ENGINEER



04/11/25
DATE

DOCUMENT 000105 – CERTIFICATIONS AND SEALS

Civil Engineer:

I hereby state that the Specifications intended to be authenticated by my seal are limited to Specification Sections listed below:

Division 31 Sections: 311000 & 312000
Division 32 Sections: 321216, 321313, 321373, & 323113
Division 33 Sections: 331100 & 334100

I hereby disclaim any responsibility for all other specifications, drawings estimates, reports, or other documents or instruments relating to or intended to be used for any part or parts of the architectural or engineering project or survey.

Engineer

Date



SECTION 000105 - CERTIFICATIONS PAGE - MEP

MEP ENGINEER

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 21 SECTIONS:	210500, 210553, 211300, 212200
DIVISION 22 SECTIONS:	220517, 220523, 220529, 220553, 220719, 221005, 221006, 223000, 224000
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DIVISION 28 SECTIONS:	284600

I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.



JACOB NELSON, PE

MO# PE-2009018758

04/11/2025

ENGINEER

DATE

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 Project No. 23195
 Site Address 1712 South Lafayette Avenue,
 City, State Zip Sedalia, Missouri 65301

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PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Notice to Bidders: Prequalified bidders are hereby invited to submit bids for the 23195 Sedalia Central Office Renovation. Bids shall be fully executed, signed and sealed in envelopes as described in this Document according to the Instructions to Bidders and as amended by the Supplementary Instructions to Bidders.
- B. Project Identification:
 - 1. Project Address: 1712 S. Lafayette Ave. , Sedalia, Missouri 65301
- C. Owner: Sedalia School District 200
 - 1. Owner's Address: 2806 Matthew Drive, Sedalia, Missouri 65301
 - 2. Owner's Representative: Richie Simons
- D. Architect:
 - 1. Architect's Address: Hollis + Miller Architects, Inc., 1828 Walnut Street, Suite 922, Kansas City, MO 64108
 - 2. Architect's Representative: Philip Korthanke
- E. Project Description: Work of Project is defined by the Contract Documents and consists of the following:
 - 1. As shown on the Contract Drawings and the Contract Specifications.
- F. Construction Contract: Bids will be received for the following Work:
 - 1. General Contract (all trades).
- G. Bidders are advised that the School District is tax exempt pursuant to Sections 144.030.2 and 144.615, RSMo. The School District will furnish the successful Bidder with current copies of their Missouri Project Exemption certificate and Missouri Tax Exemption Letter. The Contractor will review Paragraph 3.6.2 of Supplementary Conditions regarding taxes.
- H. Bidders are further advised that a Prevailing Wage Determination prepared by the Missouri Division of Labor Standards is in effect on this project and is included in this Project Manual. Provisions of Section 290.262 CUM, Supp RSMo (2000) shall apply to this Project.
 - 1. The Annual Wage Order No. 31 Section 080 (Pettis County), as filed with the Secretary of State, is attached hereto and made part of this Specification.
 - 2. Copies may also be obtained online at: <https://laborwebapps.mo.gov/dls/prevailingwage>

1.2 BID SUBMITTAL AND OPENING

- A. Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
 - 1. Bid Date: May 8, 2025.
 - 2. Bid Time: 1:00 pm
 - 3. Location: 1700 S. Lafayette Ave, Sedalia, Missouri 65301
- B. Bids will be thereafter publicly opened and read aloud. Bids received after the bid time listed above will be returned to the Bidder unopened.
- C. The bidding procedure shall be in accordance with all applicable provision of Missouri law, including but not limited to Mo. Rev. Statute. 177.086.
- D. Bids shall not contain any recapitulation of the work to be done. No oral, telegraphic or telephonic proposals for modifications will be considered.

1.3 BID SECURITY

- A. Bid security shall be submitted with each bid of \$15,000 or greater in the amount of 5 percent of the bid amount, including all additive alternates and made payable to the Owner. No bids may be withdrawn for a period of 60 days after opening of bids.
 - 1. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.
- B. All Bid Securities will be retained by the Owner until an Agreement is signed and a satisfactory Performance and Payment Bond is received by the Owner.

1.4 PREBID CONFERENCE

- A. A mandatory prebid conference for all bidders will be held at 1712 S. Lafayette Ave, Sedalia, Missouri on Thursday, April 24, 2025 at 1:00 p.m. local time. Prospective bidders are required to attend.

1.5 DOCUMENT PROCUREMENT

- A. Printed Procurement and Contracting Documents: Obtain after 4:30 p.m. local time April 11, 2025 by contacting Drexel Technologies, (913) 371-4430, www.drexeltech.com.
 - 1. All contractors may purchase printed sets of bidding documents at cost by contacting Drexel Technologies, Inc.
 - 2. Copies of plans and specifications can be seen or purchased for a Non-Refundable fee on-line at www.drexeltech.com in their eDistribution plan room, additional assistance is available at distribution@drexeltech.com. Information regarding this project can be found in the "Public" link on the website. Contractors desiring the Contract Documents for use in preparing bids may also obtain a set of such documents from Drexel Technologies; 10840 West 86th Street, Lenexa, KS 66214, telephone number is 913-371-4430. Bidding documents will be shipped only if the requesting party assumes responsibility for all related charges. Corporate, certified, or cashier's checks shall be made payable to Drexel Technologies, Inc.
 - a. Only complete sets of documents will be issued.
- B. Online Procurement and Contracting Documents: Obtain access after 4:30 p.m. local time April 11, 2025 by contacting Drexel Technologies, (913) 371-4430, www.drexeltech.com. Online access will be provided to prime bidders, and to all registered bidders and material suppliers.
- C. Examination of the Bidding Documents: Bidding documents will be on file at Drexel Technologies, Inc. for bidder's review and examination, during normal business hours. Bidding documents may also be viewed on-line at www.drexeltech.com, in accordance with the Instructions to Bidders.

1.6 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Time is of the essence for this Project. Bidders shall begin the Work on receipt of the Notice to Proceed and shall achieve Substantial Completion as set forth: must be completed by the dates indicated below:
 - 1. Substantial Completion: March 13, 2026
 - 2. Final Completion: May 01, 2026
- B. Liquidated Damages for substantial completion will be assessed if the general contractor has not achieved adequate progress to permit school district personnel occupancy and use of all noted areas of the building and/or site in accordance with the dates for substantial completion noted above. Damages will accrue and will be based on the unavailability of the building space(s) and/or site for their intended purposes as determined by the school district. Liquidated damages noted are tiered and are based on the intended use of the building and/or site in accordance with the school schedules proposed or established.

1. Final completion of construction related activities including the satisfactory completion of all punchlist corrections shall be completed in accordance with the timeframe noted above for each building and/or area. Liquidated damages associated with final completion shall be assessed based on any actual cost incurred by the school district due to the restricted use of the facility; and for costs that may be associated with inconvenience, lack of efficiency, and/or district personnel costs associated with providing exclusive access for the general contractor to complete punchlist corrections after normal school day operation and/or on weekends or holidays. Similarly, any actual costs incurred by the school district for extended or additional architect/engineer services made necessary as a result of the general contractor's inability to meet final completion will be assessed as liquidated damages to the general contractor.
- C. Bidders shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time. Work is subject to liquidated damages in the amount of \$1,000 per day if project is delayed beyond the contracted completion date.

1.7 BIDDER'S QUALIFICATIONS

- A. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, a separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder.
- B. Each Contractor desiring to Bid this work must have a minimum of seven (7) years continuous experience under the current company name and must submit the "Contractor's Qualification Statement", AIA Document A305 along with Bid. This Qualification Statement is available at the Office of the American Institute of Architects (AIA) at 1801 McGee Street, Kansas City, Missouri 64108, telephone: (816) 221-3485. The Architect will review the Qualification Statement with the Owner. The Owner has the right to take such steps as he deems necessary, to determine the ability of the Contractor to perform the work. The Contractor shall furnish to the Owner such additional information and data for this purpose as he may request. The right is reserved to reject any Bid, or Bidder, after an investigation or consideration of the information submitted by such Contractor. Refer to Document 004513.
- C. Owner reserves the right to reject any Contractor and Contractor's Proposal where investigation or consideration of the information submitted by the Contractors does not satisfy the Owner that the Bidder has previous experience in performing similar or comparable work, sufficient business and technical organization, financial resources and plant available to perform the Work.

1.8 SUPPLEMENTAL REQUIREMENTS

- A. The selected Bidder shall, within fifteen (15) days after Award of the Contract, submit the following Post-Bid information:
 1. A statement of costs of the major portions of the work included in the Bid and any specific item of cost requested.
 2. A designation of the Work to be performed by the Bidder with his own forces.
- B. The selected Bidder shall, submit the following with the Bid:
 1. **Due by 4:00 pm CDT** submitted to the Architect on the day of the bid; a list of names of the Subcontractors, manufacturers, fabricators, and material suppliers or other persons or organizations proposed for each principal portion of the Work as may be designed by the Architect. The Bidder will be required to establish to the satisfaction of the Owner and Architect the reliability and responsibility of the proposed persons or entities to furnish and perform their Work. Prior to the contract, if the Owner or Architect has a reasonable and substantial objection to any person or entity on such list, and refused in writing to accept such person or entity, the bidder may, at his option, withdraw his Bid without forfeiture of Bid Security. If the Bidder submits an acceptable substitute with any increase in his Bid price to cover the difference in cost occasioned by such substitution, the Owner may, at his discretion, accept the increased Bid price or he may disqualify the Bidder. Subcontractors and other persons and entities proposed by the bidders and accepted by the Owner and Architect must be used on the work for which they were proposed and accepted and shall not be changed except with the written approval of the Owner and the Architect.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF DOCUMENT 001100

SECTION 002100 - INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.1 DOCUMENTS

- A. A copy of the American Institute of Architects Document A701, Instructions to Bidders 1997 Edition, is bound hereinafter as amended by Document 002200 – Supplementary Instruction to Bidders. This Document is included for information only and may not be duplicated.
- B. Additional copies of the Instructions to Bidders may be obtained, at cost, from the Local Chapter, of the American Institute of Architects, at the addresses listed below:
 - 1. AIA Springfield
 - a. Address: 1717 E. Republic Rd, Ste. A, Springfield, Missouri 65804.
 - b. Telephone: (417) 886-8606.
 - c. Website: www.aiaspringfield.org
 - 2. AIA Kansas City
 - a. Address: 1801 McGee, Suite 100, Kansas City, Missouri 64108
 - b. Telephone: (816) 221-3485.
 - c. Website: www.aiakc.org
 - 3. AIA Mid Missouri
 - a. Address: P. O. Box 1622, Columbia, Missouri 65205
 - b. Website: www.aiamid-missouri.com
 - 4. AIA St. Louis
 - a. Address: 911 Washington Street, #100, St. Louis, Missouri 63101
 - b. Telephone: (314) 621-3484
 - c. Website: www.aia-stlouis.org
 - 5. AIA Missouri
 - a. Address: 204 East High Street, Jefferson City, Missouri 65101
 - b. Telephone: (573) 635-8555
 - c. Website: www.aiamo.org
 - 6. AIA Kansas
 - a. Address: 700 SW Jackson, Suite 209, Topeka, KS 66603
 - b. Telephone: (785) 357-5308
 - c. Website: www.aiaks.org
- C. Additional copies of the Instructions to Bidders may also be obtained, at cost, from the website of the American Institute of Architects, at the internet address listed below:
 - 1. Website: <http://www.aia.org/contractdocs/index.htm>

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 002100

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DRAFT AIA® Document A701™ – 2018

Instructions to Bidders

for the following Project:
(Name, location, and detailed description)

[insert project name]

THE OWNER:

(Name, legal status, address, and other information)

[insert owner information]

THE ARCHITECT:

(Name, legal status, address, and other information)

Hollis + Miller Architects
1828 Walnut Street, Ste 922
Kansas City, MO 64108
Phone: (816) 442-7700

TABLE OF ARTICLES

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ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™-2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

« »

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper

documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

« »

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

« »

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

« »

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall

affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning « » days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:

(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

« »

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:

(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

« »

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

« »

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

« »

- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

« »

- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

« »

- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013.)

« »

- .5 Drawings

Number

Title

Date

- .6 Specifications

Section	Title	Date	Pages
.7 Addenda:			
Number	Date	Pages	
.8 Other Exhibits:			
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)			
[<input type="checkbox"/>] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:			
(Insert the date of the E204-2017.)			
<input type="checkbox"/> <input type="checkbox"/>			
[<input type="checkbox"/>] The Sustainability Plan:			
Title	Date	Pages	
[<input type="checkbox"/>] Supplementary and other Conditions of the Contract:			
Document	Title	Date	Pages
.9 Other documents listed below:			
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)			
<input type="checkbox"/> <input type="checkbox"/>			

SECTION 004200 - BID PROPOSAL

PART 1- GENERAL

1.1 DECLARATION OF BID PROPOSAL

- A. Proposal of _____ (hereinafter called "Bidder"), organized and existing under the laws of the State of _____, doing business as (a corporation) / (a partnership) / (an individual) (circle one) to the Board of Education, Sedalia School District 200 of Sedalia, Missouri (hereinafter called "Owner").

1.2 BID PROPOSAL

- A. In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all work for the 23195 Sedalia Central Office Renovation in strict accordance with the Contract Documents, within the time set forth herein and at the prices stated below. Bidder should propose on individual base bids for specific project locations as noted below. Owner will award contract per individual base bid.

- B. The Bidder hereby understands that time is of the essence on this project and is aware of the following critical completion dates:

CONSTRUCTION START DATES	PROJECT	SUBSTANTIAL COMPLETION	FINAL COMPLETION
June 02, 2025	Sedalia Central Office Relocation	March 13, 2026	May 01, 2026

- C. The Bidder hereby understands that Liquidated Damages for the delay in completions shall be **\$1000.00** per calendar day.
- D. By submission of this Bid, each Bidder certifies, and in the case of a joint Bid each party thereto certifies as to its own organization, that this Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder or with any competitor.
- E. Bidder acknowledges receipt of the following ADDENDA: _____.
- F. The undersigned, having familiarized itself with local conditions affecting the cost of the work at the place where the work is to be done and with all Bidding Documents, including the Instructions to Bidders, Plans and Specifications, General and Supplementary Conditions, the Standard Form of Agreement and the other Contract Documents, and having examined the location of the proposed work and considered the availability of labor and materials, hereby proposes and agrees to perform everything required to be performed, and to provide and furnish any and all labor, materials, supervision, necessary tools, equipment, and all utility and transportation service necessary to perform and complete in a workmanlike and timely manner all of the work required for the project, all in strict conformance with the Instructions to Bidders and other Contract Documents (including Addenda noted above, the receipt of which is hereby acknowledged), for the lump sums hereinafter specified.

1.3 BASE BID:

- A. Bidder agrees to perform all the work described in the Contract Documents for **23195 Sedalia Central Office Renovation** for the lump sum total of:
- B. _____ Dollars and _____ cents.
- C. \$ _____.

1.4 AMOUNTS FOR ALLOWANCES:

- A. Bidder agrees to include in the Base Bid amount the following allowances, as called for by the above documents. The base bid as stated above includes all necessary appurtenances and connections required to complete the Work in place, insurance, overhead, profit, and superintendence for these allowances.

Allowance 01: 23195 - For Unforeseen Conditions	\$ 15,000
---	-----------

- B. Bidder agrees to include in the Base Bid amount the following contingency allowances, as called for by the above documents.

1.5 AMOUNTS FOR UNIT PRICES:

- A. Bidder propose to base adjustments in the Contract Sum, if ordered by Architect during the Contract Time, on the unit prices listed below. These prices constitute full compensation or credit for the complete provision and installation for each item listed based solely on Work in place. The Unit Prices as stated include all necessary appurtenances and connections required to complete the Work in place, insurance, overhead, profit, and superintendence.

Unit Price 01: 23195 - Tuckpointing	\$ _____ / (SF)
Unit Price 02: 23195 - Crack Fill	\$ _____ / (LF)
Unit Price 03: 23195 - Full Depth Repair (8")	\$ _____ / (SY)
Unit Price 04: 23195 - Edge Mill Overlay	\$ _____ / (SF)
Unit Price 05: 23195 - Concrete Removal and Replacement	\$ _____ / (SF)
Unit Price 06: 23195 - Concrete Curb Removal and Replacement	\$ _____ / (SF)

1.6 AMOUNTS FOR ALTERNATES

- A. Bidder proposes to furnish all materials, labor, plant and appurtenances called for by the above documents for the alternates for the following sums and to allow for the Owner a period of sixty (60) days from the date of Contract Award to accept or reject the Alternates without change in the Alternate Amount or contract Time. Circle "Add" or "Deduct" as it applies for each Alternate.

Alternate 01: 23195 - Boardroom Ceiling	\$ _____ (Add / Deduct)
Alternate 02: 23195 - Widening/Replacing Existing Windows	
Replace Existing One (1) Window	\$ _____ (Add / Deduct)
Replace Existing Ten (10) Windows	\$ _____ (Add / Deduct)
Replace Existing Nineteen (19) Windows	\$ _____ (Add / Deduct)

1.7 COMPLETION OF THE WORK

- A. If we are notified of the acceptance of the Base Bid of this Proposal within **ninety (90) days** after the above date, we agree to execute a Contract for the above Work, for the above stated compensation in the form of the Standard Agreement Between Owner and Contractor, AIA Document A101-2017, of the American Institute of Architects, as modified by Owner.

1.8 TAX EXEMPTION:

- A. This project shall be considered Tax Exempt. Federal, State and local taxes shall not be included with the Bid. Subsequent to the award of the construction contract, the School District will obtain from the State of Missouri, a sales tax exemption certificate number. The sales tax exemption certificate will permit the Contractor to purchase materials for incorporation into this project without paying sales tax, provided that the Contractor furnishes the certificate number to the material supplier.

1.9 CHANGES IN THE WORK:

- A. Changes in the Work shall be as established in the Contract Documents. The Undersigned agrees that his net fees shall set forth below, include Overhead, Profit, and General Requirements (including but not limited to; insurance and bonds.) The following fees shall be used for Lump Sum pricing and actual cost pricing of additions and deletions to that work included in the Bid, namely:

	Profit & Overhead	Not To Exceed
To Contractor for work performed by his/her own forces.	%	10%
To Contractor for work performed by other than his/her own forces.	%	5%
To Subcontractor for work performed by his/her own forces.	%	10%
To Subcontractor for work performed other than his/her own forces.	%	5%

1.10 SUBCONTRACTORS

- A. The bidder hereby certifies that the following subcontractors will be used in the performance of the work on each or both projects. ALL General Contractors MUST furnish a copy of their proposed **Sub-Contractor List by 4:00 PM CDT** on bid day to be considered as valid. If not submitted at the time of Bidding, the list may be delivered, emailed () to the A/E offices, but must be received by no later than the time listed above.

1.11 BID SECURITY

- A. Bidders whose Bid includes both labor and materials and whose Base Bid amount is \$5,000.00 or greater, agrees to and has attached hereto a Bid Bond for the amount of five percent (5%) of the amount of the Bid submitted.
- B. This Bid Security is to be left in escrow with the Architect. If the Undersigned defaults in executing the Agreement within three (3) days of written notification of the award of the Contract to him, or in furnishing the Performance Bond within fourteen (14) days thereafter, the Bid Security will become the property of the Owner and will be delivered to him by the Architect. If the Undersigned executes and delivers the Agreement and Bond within the time specified, or if the Base Bid of this Proposal is not accepted within sixty (60) days of the time set for submission of Bids, the Bid Security shall be returned to the Contractor upon delivery of a receipt therefore.
- C. If the Undersigned defaults in executing and delivering the above-named Agreement and the required performance Bond, the Owner would sustain liquidated damages for five percent (5%) of the amount of the Bid submitted, the measure of which is the amount of the accompanying Bid Bond, Certified Check, or Cashier's Check, payable to "Sedalia School District 200".

1.12 ACKNOWLEDGEMENTS

- A. The undersigned further acknowledges that the he has familiarized himself with local conditions affecting the cost of the work at each place where the work is to be done.
- B. In submitting this bid, the undersigned agrees:
1. To furnish all material, labor, tools, expendable equipment, and all utility and transportation services necessary to perform and complete, in a workmanlike manner, all the work required in accord with the bid documents.
 2. To hold this bid open for **ninety (90) days** after the receipt of bids and to accept the provisions of the instructions to bidders regarding disposition of bid security.
 3. To commence the work upon receipt of Notice to Proceed, and to substantially complete the work not later than the dates set forth on the Invitation to Bid. (see specifications)
 4. To accept the assessment of liquidated damages as noted for each calendar day following the substantial completion dates listed above. (see specifications)
 5. All materials to be non-proprietary, as specified, or approved equal as noted in specifications.
- C. In submitting this bid, it is understood that the right to reject any and all bids and to waive irregularities in this bidding has been reserved by the Owner.

1.13 SIGNATURES

- A. Signature: _____
- B. Printed Name: _____
- C. Title: _____
- D. Company Name: _____
- E. Address: _____
- F. Phone: _____
- G. Email: _____
- H. Seal: - (if BID is by a corporation)

SUBCONTRACTOR LIST

[illegible]

END OF SECTION 004200

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SECTION 004313 - BID SECURITY FORM

PART 1 - GENERAL

1.1 PROPOSAL FORM SUPPLEMENT

- A. A completed bid bond form is required to be attached to the Proposal Form.

1.2 BID BOND FORM

- A. The Form of the bid security shall be American Institute of Architects (AIA), Document A310 – 2010 “Bid Bond”. A copy of the Bid Bond form is bound hereinafter for information only and may not be duplicated.
- B. Additional copies of the Bid Bond may be obtained, at cost, from the Local Chapter, of the American Institute of Architects, at the address listed below:
 - 1. AIA Springfield
 - a. Address: 1717 E. Republic Rd, Ste. A, Springfield, Missouri 65804.
 - b. Telephone: (417) 886-8606.
 - c. Website: www.aiaspringfield.org
 - 2. AIA Kansas City
 - a. Address: 1801 McGee, Suite 100, Kansas City, Missouri 64108
 - b. Telephone: (816) 221-3485.
 - c. Website: www.aiakc.org
 - 3. AIA Mid Missouri
 - a. Address: P. O. Box 1622, Columbia, Missouri 65205
 - b. Website: www.aiamid-missouri.com
 - 4. AIA St. Louis
 - a. Address: 911 Washington Street, #100, Louis, Missouri 63101
 - b. Telephone: (314) 621-3484
 - c. Website: www.aia-stlouis.org
 - 5. AIA Missouri
 - a. Address: 204 East High Street, Jefferson City, Missouri 65101
 - b. Telephone: (573) 635-8555
 - c. Website: www.aiamo.org
- C. Additional copies of the Bid Bond may also be obtained, at cost, from the website of the American Institute of Architects, at the internet address listed below:
 - 1. Website: <http://www.aia.org/contractdocs/index.htm>

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 004313

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DRAFT AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

[insert owner information]

BOND AMOUNT: \$ « »

PROJECT:

(Name, location or address, and Project number, if any)

[insert project name]

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

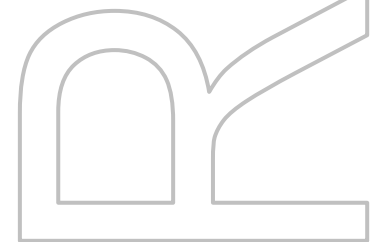
If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.



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furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this « » day of « », « »

(Witness)

(Witness)

« »

(Contractor as Principal)

(Seal)

« »

(Title)

« »

(Surety)

(Seal)

« »

(Title)

SECTION 004513 - CONTRACTOR'S QUALIFICATION STATEMENT

PART 1 - GENERAL

1.1 CONTRACTOR'S QUALIFICATION STATEMENT

- A. The form of the Contractor's Qualifications shall be American Institute of Architects (AIA) Document A305 – 1986 "Contractor's Qualification Statement". A copy of the Contractor's Qualification Statement is bound hereinafter for information only and may not be duplicated.
1. Contractors are to provide a minimum of three references of major projects completed within the past five years. Refer to paragraph 3.5 of AIA Document A305.
- B. Additional copies of the Contractor's Qualification Statement may be obtained, at cost, from the Local Chapter, of the American Institute of Architects, at the address listed below:
1. AIA Springfield
 - a. Address: 1717 E. Republic Rd, Ste. A, Springfield, Missouri 65804.
 - b. Telephone: (417) 886-8606.
 - c. Website: www.aiaspringfield.org
 2. AIA Kansas City
 - a. Address: 1801 McGee, Suite 100, Kansas City, Missouri 64108
 - b. Telephone: (816) 221-3485.
 - c. Website: www.aiakc.org
 3. AIA Mid Missouri
 - a. Address: P. O. Box 1622, Columbia, Missouri 65205
 - b. Website: www.aiamid-missouri.com
 4. AIA St. Louis
 - a. Address: 911 Washington Street, #100, Louis, Missouri 63101
 - b. Telephone: (314) 621-3484
 - c. Website: www.aia-stlouis.org
 5. AIA Missouri
 - a. Address: 204 East High Street, Jefferson City, Missouri 65101
 - b. Telephone: (573) 635-8555
 - c. Website: www.aiamo.org
 6. AIA Kansas
 - a. Address: 700 SW Jackson, Suite 209, Topeka, KS 66603
 - b. Telephone: (785) 357-5308
 - c. Website: www.aiaks.org
- C. Additional copies of the Contractor's Qualification Statement may also be obtained, at cost, from the website of the American Institute of Architects, at the internet address listed below:
1. Website: <http://www.aia.org/contractdocs/index.htm>

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 004513

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DRAFT AIA® Document A305™ – 2020

Contractor's Qualification Statement

SUBMITTED BY:

(Organization name and address.)

« »

SUBMITTED TO:

(Organization name and address.)

« »

TYPE OF WORK TYPICALLY PERFORMED

(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)

« »

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:

(Check all that apply.)

- [« »] Exhibit A – General Information
- [« »] Exhibit B – Financial and Performance Information
- [« »] Exhibit C – Project-Specific Information
- [« »] Exhibit D – Past Project Experience
- [« »] Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION

The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

Organization's Authorized Representative
Signature

« »

Date

« »

Printed Name and Title

NOTARY

State of: « »

County of: « »

Signed and sworn to before me this « » day of « » « »

Notary Signature

My commission expires: « »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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SECTION 005200 - AGREEMENT FORM

PART 1 - GENERAL

1.1 OWNER AND CONTRACTOR AGREEMENT

- A. The form of the agreement shall be American Institute of Architects (AIA) Document A101 – 2017, “Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum”. The “agreement” is included by reference.
- B. A copy of AIA Document A101 – 2017 may be obtained, at cost, from the Local Chapter, of the American Institute of Architects, at the address listed below:
 - 1. AIA Springfield
 - a. Address: 1717 E. Republic Rd, Ste. A, Springfield, Missouri 65804.
 - b. Telephone: (417) 886-8606.
 - c. Website: www.aiaspringfield.org
 - 2. AIA Kansas City
 - a. Address: 1801 McGee, Suite 100, Kansas City, Missouri 64108
 - b. Telephone: (816) 221-3485.
 - c. Website: www.aiakc.org
 - 3. AIA Mid Missouri
 - a. Address: P. O. Box 1622, Columbia, Missouri 65205
 - b. Website: www.aiamid-missouri.com
 - 4. AIA St. Louis
 - a. Address: 911 Washington Street, #100, Louis, Missouri 63101
 - b. Telephone: (314) 621-3484
 - c. Website: www.aia-stlouis.org
 - 5. AIA Missouri
 - a. Address: 204 East High Street, Jefferson City, Missouri 65101
 - b. Telephone: (573) 635-8555
 - c. Website: www.aiamo.org
- C. Copies of AIA Document A101 – 2017 may also be obtained, at cost, from the website of the American Institute of Architects, at the internet address listed below:
 - 1. Website: <http://www.aia.org/contractdocs/index.htm>
- D. Attachments to the Section:
 - 1. Draft of AIA A101-2017.
 - 2. Exhibit A.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 005200

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DRAFT AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

[insert project name]

and the Contractor:
(Name, legal status, address and other information)

[insert owner information]

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

Hollis + Miller Architects
1828 Walnut Street, Ste 922
Kansas City, MO 64108
Phone: (816) 442-7700

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

☒ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. (Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

<< >>

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

<< >>

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

<< >>

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

<< >>

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

<< >> % << >>

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

<< >>

<< >>

<< >>

<< >>

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☐ Litigation in a court of competent jurisdiction

☐ Other (Specify)

<< >>

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

<< >>

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

<< >>

<< >>

<< >>

<< >>

<< >>

<< >>

§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

<< >>

<< >>

<< >>

<< >>

<< >>

<< >>

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

« »« »

(Printed name and title)

CONTRACTOR (Signature)

« »« »

(Printed name and title)

DRAFT AIA® Document A101® – 2017

Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

[insert project name]

THE OWNER:
(Name, legal status and address)

[insert owner information]

THE CONTRACTOR:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™-2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A201®-2017, General Conditions of the Contract for Construction. Article 11 of A201®-2017 contains additional insurance provisions.

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§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:

(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- [☐] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

☐ ☐

- [☐] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

☐ ☐

- [☐] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

☐ ☐

- [☐] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

☐ ☐

- [☐] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

☐ ☐

- [☐] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

☐ ☐

- [☐] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

☐ ☐

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[☐] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. (Indicate applicable limits of coverage or other conditions in the fill point below.)

« »

[☐] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than « » (\$ « ») each occurrence, « » (\$ « ») general aggregate, and « » (\$ « ») aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;

- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than « » (\$ « ») per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than « » (\$ « ») each accident, « » (\$ « ») each employee, and « » (\$ « ») policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

- [« »] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
- (Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)*

« »

- [« »] § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate, for Work within fifty (50) feet of railroad property.
- [« »] § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.
- [« »] § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- [« »] § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[« »] **§ A.3.3.2.6 Other Insurance**

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

« »

SECTION 006113 - PERFORMANCE AND PAYMENT BOND

PART 1 - GENERAL

1.1 PERFORMANCE BOND AND PAYMENT BOND

- A. The forms for the bonds shall be American Institute of Architects (AIA) Document A312 - 2010, "Performance Bond and Payment Bond". A copy of each of the bonds is bound hereinafter for information only and may not be duplicated.
- B. Additional copies of the performance bond and payment bond may be obtained, at cost, from the Local Chapter, of the American Institute of Architects, at the address listed below:
 - 1. AIA Springfield
 - a. Address: 1717 E. Republic Rd, Ste. A, Springfield, Missouri 65804.
 - b. Telephone: (417) 886-8606.
 - c. Website: www.aiaspringfield.org
 - 2. AIA Kansas City
 - a. Address: 1801 McGee, Suite 100, Kansas City, Missouri 64108
 - b. Telephone: (816) 221-3485.
 - c. Website: www.aiakc.org
 - 3. AIA Mid Missouri
 - a. Address: P. O. Box 1622, Columbia, Missouri 65205
 - b. Website: www.aiamid-missouri.com
 - 4. AIA St. Louis
 - a. Address: 911 Washington Street, #100, Louis, Missouri 63101
 - b. Telephone: (314) 621-3484
 - c. Website: www.aia-stlouis.org
 - 5. AIA Missouri
 - a. Address: 204 East High Street, Jefferson City, Missouri 65101
 - b. Telephone: (573) 635-8555
 - c. Website: www.aiamo.org
- C. Additional copies of the performance bond and payment bond may also be obtained, at cost, from the website of the American Institute of Architects, at the internet address listed below:
 - 1. Website: <http://www.aia.org/contractdocs/index.htm>

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 006113

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DRAFT AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

[Redacted Contractor Information]

SURETY:

(Name, legal status and principal place of business)

[Redacted Surety Information]

OWNER:

(Name, legal status and address)

[insert owner information]

[Redacted Owner Information]

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

[insert project name]

[Redacted Construction Contract Description]

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this Bond: « » None « » See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature:

Name and « »

Title:

(Any additional signatures appear on the last page of this Performance Bond.)

SURETY

Company: (Corporate Seal)

Signature:

Name and « »

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

« »
« »
« »

OWNER'S REPRESENTATIVE:

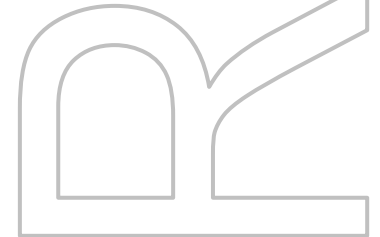
(Architect, Engineer or other party:)

Hollis + Miller Architects
1828 Walnut Street, Ste 922
Kansas City, MO 64108
Phone: (816) 442-7700

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.



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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the

Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature:

Name and Title: « »« »

Address: « »

SURETY

Company: (Corporate Seal)

Signature:

Name and Title: « »« »

Address: « »

DRAFT AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

[Redacted Contractor Information]

SURETY:

(Name, legal status and principal place of business)

[Redacted Surety Information]

OWNER:

(Name, legal status and address)

[insert owner information]

[Redacted Owner Information]

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

[insert project name]

[Redacted Construction Contract Description]

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this Bond: « » None « » See Section 18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature:

Name and « »« »

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature:

Name and « »« »

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

[Redacted Agent or Broker Information]

OWNER'S REPRESENTATIVE:

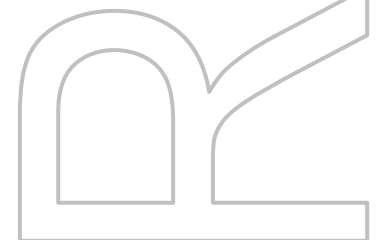
(Architect, Engineer or other party:)

Hollis + Miller Architects
1828 Walnut Street, Ste 922
Kansas City, MO 64108
Phone: (816) 442-7700

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.



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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company:

(Corporate Seal)

SURETY

Company:

(Corporate Seal)

Signature:

Name and Title:

Address:

« »« »

« »

Signature:

Name and Title:

Address:

« »« »

« »

SECTION 006273 - APPLICATION AND CERTIFICATION FOR PAYMENT

PART 1 - GENERAL

1.1 APPLICATION AND CERTIFICATION FOR PAYMENT

- A. The Form of the Application and Certificate for Payment shall be AIA Document G702 – 1992 “Application and Certification for Payment” and G703 – 1992 “Continuation Sheet. A copy of each form is bound hereinafter for information only and may not be duplicated.
- B. Additional copies of AIA Document G702 and AIA Document G703 may be obtained, at cost, from the Local Chapter, of the American Institute of Architects, at the address listed below:
 - 1. AIA Springfield
 - a. Address: 1717 E. Republic Rd, Ste. A, Springfield, Missouri 65804.
 - b. Telephone: (417) 886-8606.
 - c. Website: www.aiaspringfield.org
 - 2. AIA Kansas City
 - a. Address: 1801 McGee, Suite 100, Kansas City, Missouri 64108
 - b. Telephone: (816) 221-3485.
 - c. Website: www.aiakc.org
 - 3. AIA Mid Missouri
 - a. Address: P. O. Box 1622, Columbia, Missouri 65205
 - b. Website: www.aiamid-missouri.com
 - 4. AIA St. Louis
 - a. Address: 911 Washington Street, #100, Louis, Missouri 63101
 - b. Telephone: (314) 621-3484
 - c. Website: www.aia-stlouis.org
 - 5. AIA Missouri
 - a. Address: 204 East High Street, Jefferson City, Missouri 65101
 - b. Telephone: (573) 635-8555
 - c. Website: www.aiamo.org
- C. Additional copies of AIA Document G702 and AIA Document G703 may also be obtained, at cost, from the website of the American Institute of Architects, at the internet address listed below:
 - 1. Website: <http://www.aia.org/contractdocs/index.htm>

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 006273

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Application and Certificate for Payment

TO OWNER:

PROJECT:

FROM CONTRACTOR:

CONTRACTOR:

1828 Walnut Street, Ste 922
Kansas City, MO 64108

VIA ARCHITECT:

Hollis + Miller Architects

APPLICATION NO: 001

PERIOD TO:

CONTRACT FOR:

CONTRACT DATE:

PROJECT NOS:

Distribution to:

OWNER:

ARCHITECT:

CONTRACTOR:

FIELD:

OTHER:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM	\$0.00
2. NET CHANGE BY CHANGE ORDERS	\$0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)	\$0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)	\$0.00

5. RETAINAGE:

a. 0 % of Completed Work (Column D + E on G703):	\$0.00	=	\$0.00
b. 0 % of Stored Material (Column F on G703):	\$0.00	=	\$0.00
Total Retainage (Lines 5a + 5b or Total in Column I of G703):			

6. TOTAL EARNED LESS RETAINAGE	\$0.00
(Line 4 Less Line 5 Total)	
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT	\$0.00
(Line 6 from prior Certificate)	
8. CURRENT PAYMENT DUE	\$0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE	\$0.00
(Line 3 less Line 6)	

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: Date: This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$0.00	\$0.00
Total approved this Month	\$0.00	\$0.00
TOTALS	\$0.00	\$0.00
NET CHANGES by Change Order		\$0.00

SECTION 006275 - PARTIAL LIEN WAIVERS

PART 1 - GENERAL

1.1 PARTIAL LIEN WAIVER

- A. Reference that certain Agreement between _____, as Contractor, and Sedalia School District 200 of Sedalia, Missouri in Pettis County County as Owner, dated on the Project known as: 23195 Sedalia Central Office Renovation, Project No. 23195, for work to be performed by said Contractor.
- B. Reference also that certain Invoice (s) No(s). _____ of Contractor to said Owner in the amount of \$ _____ for work, labor, and materials installed in or furnished for said Project as of _____, 20_____.
- C. Upon receipt of the Owner's remittance for the amount of said invoice(s) and contingent upon the final clearance and payment of said remittance, Contractor agrees to and does hereby waive and release said property, Project and Owner from any and all liens, statutory or otherwise, for any and all work, labor and materials furnished by or through _____ Contractor on said Project to and including the work, labor, and materials covered by said above numbered invoice(s) except for unpaid retainage.
- D. The remittance of the Owner's identified as payment of said above numbered invoice(s) as endorsed by Contractor marked "paid" or otherwise canceled by the bank against which said remittance was drawn shall constitute conclusive proof that said Invoice(s) were paid and that payment thereof was received by Contractor and this lien waiver shall become effective automatically and without requirement of any further act, acknowledgement or receipt on the part of the Contractor named herein.

DATED THIS _____ DAY OF _____, 20_____.

BY _____

TITLE _____

NOTARY SEAL (BELOW)

NOTARY PUBLIC _____

SUBSCRIBED AND SWORN TO BEFORE ME WITHIN AND FOR

STATE OF _____

COUNTY OF _____

ON THIS _____ DAY OF _____, 20_____

MY COMMISSION EXPIRES _____

END OF SECTION 006275

SECTION 006276 - BAILMENT RECEIPT

PART 1 - GENERAL

1.1 BAILMENT RECEIPT

- A. Reciept No. _____
- B. Bailor Name: Sedalia School District 200
- C. Bailor Address: 2806 Matthew Drive, Sedalia, Missouri 65301
- D. Bailee (Contractor/Supplier): _____
- E. Bailee Address: _____
- F. Project: _____
- G. Location of Storage: _____
- H. The goods and materials described below are held and stored pursuant to the Contract by and between Bailee, as Contractor/Supplier, and Sedalia School District 200 of Sedalia , Missouri in Pettis County County as Owner, for Work to be performed at the above referenced Project Location. Said goods and materials are to be transferred or delivered to the Project site in conjunction with the performance of Bailee's Contract referenced above or upon the direction of Bailor or its General Contractor and no other. The Bailee acknowledges that it has no ownership rights or title in, nor shall claim any lien upon, said goods and materials.

QUANTITY	DESCRIPTION OF ITEM

QUANTITY	DESCRIPTION OF ITEM

RECEIPTED AND ACKNOWLEDGED BY:

CONTRACTOR / SUPPLIER (BAILEE)

ON THIS _____ DAY OF _____, 20 _____

END OF SECTION 006276

SECTION 006277 - BILL OF SALE

PART 1 - GENERAL

1.1 BILL OF SALE

- A. Seller:
1. _____, Subcontractor or Supplier
 2. _____, Address
 3. _____, City, State Zip
- B. In consideration of payments made pursuant to its Contract with Sedalia School District 200 of Sedalia, Missouri in Pettis County as Owner, Buyer, dated _____, 20____ for the Projects known as 23195 Sedalia Central Office Renovation, receipt of which is hereby acknowledged, Seller does hereby grant, sell, transfer, and deliver to Buyer right, title, and interest in the following goods:
- C. _____

- D. Buyer shall have all rights and title to the goods in himself and his executors, administrators and assigns. Seller is the lawful owner of the goods and the goods are free from all encumbrances. Seller has good right to sell the goods and will warrant and defend the right against the lawful claims and demands of all persons. It is expressly understood and agreed that the acceptance of the goods described herein is not a waiver of any right of action that the Buyer may have for breach of warranty of any other cause under the Contract referenced above or at law.
- E. In Witness Whereof, Seller has executed this Agreement the _____ day of _____, 20_____.
- F. Seller: _____ (subcontractor, supplier)
- G. By: _____
- H. Title: _____

PART 2 - ASSIGNMENT OF BILL OF SALE

2.1 ASSIGNMENT OF BILL OF SALE

- A. _____, in consideration of payments made by _____, Owner, pursuant to its Contract dated _____, 20_____ for the project known as 23195 Sedalia Central Office RenovationI, does hereby assign this Bill of Sale to Owner.
- B. By: _____
- C. Title: _____
- D. Date: _____

END OF DOCUMENT 006277

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SECTION 007200 - GENERAL CONDITIONS

PART 1 - GENERAL

1.1 APPLICABLE DOCUMENTS

- A. The American Institute of Architects Document A201, "General Conditions of the Contract for Construction", 2017 Edition, is part of the Contract Documents and is included by reference, as amended by Document 007300 "Supplementary Conditions".
- B. Copies of the General Conditions may be obtained, at cost, from the Local Chapter, of the American Institute of Architects, at the address listed below:
 - 1. AIA Springfield
 - a. Address: 1717 E. Republic Rd, Ste. A, Springfield, Missouri 65804.
 - b. Telephone: (417) 886-8606.
 - c. Website: www.aiaspringfield.org
 - 2. AIA Kansas City
 - a. Address: 1801 McGee, Suite 100, Kansas City, Missouri 64108
 - b. Telephone: (816) 221-3485.
 - c. Website: www.aiakc.org
 - 3. AIA Mid Missouri
 - a. Address: P. O. Box 1622, Columbia, Missouri 65205
 - b. Website: www.aiamid-missouri.com
 - 4. AIA St. Louis
 - a. Address: 911 Washington Street, #100, Louis, Missouri 63101
 - b. Telephone: (314) 621-3484
 - c. Website: www.aia-stlouis.org
 - 5. AIA Missouri
 - a. Address: 204 East High Street, Jefferson City, Missouri 65101
 - b. Telephone: (573) 635-8555
 - c. Website: www.aiamo.org
- C. Copies of the General Conditions may also be obtained, at cost, from the website of the American Institute of Architects, at the internet address listed below:
 - 1. Website: <http://www.aia.org/contractdocs/index.htm>

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 007200

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DRAFT AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

[insert project name]

THE OWNER:

(Name, legal status and address)

[insert owner information]

THE ARCHITECT:

(Name, legal status and address)

Hollis + Miller Architects
1828 Walnut Street, Ste 922
Kansas City, MO 64108
Phone: (816) 442-7700

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set

forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect 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 Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately

suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not

have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will

similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the

Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;

- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor

change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor’s control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot

be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 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 Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to

the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance,

the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the

Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

SECTION 008100 - PREVAILING WAGE DETERMINATION

PART 1 GENERAL

1.1 PREVAILING WAGE DETERMINATIONS

- A. This Project is contracted under the requirements of Missouri Prevailing Wage Law. This Section includes general information and forms for convenience. Detailed requirements, information, forms, and assistance may be obtained by contacting the following:
1. Missouri Department of Labor and Industrial Relations Division of Labor Standards Prevailing Wage Section PO Box 449 Jefferson City, MO 65102-0449 Phone: 573-751-3403 Fax: 573-751-3721 Email: prevailingwage@labor.mo.gov Website: <https://labor.mo.gov/dls/prevailing-wage>
 2. Contractor shall be responsible for obtaining the latest information and rates regarding the Missouri Prevailing Wage Law, including but not limited to incremental increases, issued on or before the date of bids.
 3. Additional information regarding Missouri Law and Statutes can be found at the Revisor of Statutes for the State of Missouri a <https://revisor.mo.gov/>
 - a. Prevailing Hourly Rate of Wages: Not less than the prevailing hourly rate of wages, as set out in the wage order attached, must be paid to all workers performing work under this Contract.
 4. Contractor shall forfeit a penalty to the contracting public body of \$100 per day (or portion of a day) for each worker that is paid less than the prevailing rate for any work done under this Contract by the Contractor or by any Subcontractor.
 5. Submit certified copies of Contractor's and subcontractor's payrolls to contracting public body on a weekly basis.
 - a. Safety Training Program: All on-site employees, including those of Contractor and subcontractors, are required to complete the ten-hour safety training program required under Section 292.675 RSMo, if they have not previously completed the program and have documentation of having done so.
 6. Contractor shall forfeit a penalty to the contracting public body of \$2500 plus an additional \$100 for each employee, including those of subcontractors, for each calendar day, or portion thereof, such employee is employed without the required training.
 - a. Construction Transient Employers: Every transient employer, as defined in section 285.230 RSMo, must post in a prominent and easily accessible place at the site, a clearly legible copy of the notices listed below. Any transient employer failing to comply with these requirements shall, under section 285.234 RSMo, be liable for a penalty of \$500 per day until notices are posted as required by the statute:
 7. The notice of registration for employer withholding issued to such transient employer by the director of revenue.
 8. Proof of coverage for workers' compensation insurance or self-insurance signed by transient employer and verified by the Department of Revenue through records of the Division of Workers' Compensation.
 9. The notice of registration for unemployment insurance to such transient employer by the Division of Employment Security.
 - a. Posting of Wage Rates: While work under this Contract is being performed, a legible list of all prevailing wage rates must remain posted in a prominent and easily accessible location at the site by the Contractor and each subcontractor on the project. Such notice shall remain posted during the full time that any worker is employed on the project.
 - b. Project Notification - Contractor Information Notification: Before performing any Work, submit a completed PW-2 Form "Prevailing Wage Project Notification - Contractor Information Notification," available at <https://labor.mo.gov/pubs-and-forms>, to The Division of Labor Standards (DLS).
 - c. Project Completion Notification – Affidavit of Compliance: Before final payment will be made, the Contractor shall file a fully executed affidavit, PW-4 Form "Affidavit – Compliance with the Prevailing Wage Law", available at <https://labor.mo.gov/pubs-and-forms>, to The Division of Labor Standards (DLS).
 - d. Monthly Applications for Payment: Pursuant to prevailing wage laws, an Affidavit of Compliance (Form PW-4) must be filed with the District before payment will be approved. The District will withhold and retain any amounts due as a result of any violation of the prevailing wage law prior to making payment with any contractor. Include Affidavit of Compliance with each application for payment.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 008100

**PREVAILING WAGE
PROJECT NOTIFICATION –
CONTRACTOR INFORMATION**☐ **New** ☐ **Update**

The information below is requested pursuant to Sections 290.210 through 290.340, RSMo.

1. Date of Notification		2. Annual Wage Order Number Included in Bid Specifications	
3. Popular or Descriptive Name of Project			
4. Estimated Project Cost of Completion (<i>total construction contracts to be awarded</i>) \$			
5. Exact Location of Project <u>County</u> <u>City</u>			
6. Official Name of Public Body or Agency			
7. Name of Contact Person		8. Phone Number (<i>include area code</i>)	
9. Address			
10. Email Address		Website	
11. Contract Award Date	12. Estimated Date of Project Completion	13. Will There Be Any Federal Funds Used in this Contract? <input type="checkbox"/> Yes <input type="checkbox"/> No	

14. Contractor Information Notification

General Contractor: Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

List all Subcontractors:

1. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

2. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

3. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

(Subcontractors continued)

4. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

5. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

6. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

7. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

8. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

9. Name _____
Address _____
City _____ State _____ ZIP _____
Phone Number _____ Email Address _____
Type of Craftsmen Needed by Project _____
Scope of Work _____

The state of Missouri requires workers on public works projects be paid the prevailing wage. Public bodies have duties as required under Section 290.210 - 290.340, RSMo.

Mail, Fax, or Email completed form to: DIVISION OF LABOR STANDARDS
Attn: Prevailing Wage Section
P.O. Box 449, Jefferson City, MO 65102-0449
Phone: 573-751-3403 Fax: 573-751-3721
Email: prevailingwage@labor.mo.gov
Website: www.labor.mo.gov/DLS

SUBMIT

*Missouri Department of Labor and Industrial Relations is an equal opportunity employer/program.
TDD/TTY: 800-735-2966 Relay Missouri: 711*



DIVISION OF LABOR STANDARDS

MISSOURI DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
DIVISION OF LABOR STANDARDS

REQUEST FOR WAGE DETERMINATION

PLEASE RETURN TO: Division of Labor Standards
Attn: Prevailing Wage Section
P.O. Box 449
Jefferson City, MO 65102-0449

Phone: 573-751-3403
Fax: 573-751-3721
Email: prevailingwage@labor.mo.gov
Website: www.labor.mo.gov/DLS/PrevailingWage/pwBodies

REQUESTER INFORMATION

I am requesting a wage determination according to Chapter 290 of the Missouri Prevailing Wage Law (sections 290.210 through 290.340 and 290.550 through 290.580 RSMo).

Name of Requester (<i>please print</i>)		Requester Title	
Requester Organization		Phone Number (<i>include Area Code</i>)	
Mailing Address		Email Address	
City	State	ZIP Code	

PUBLIC BODY INFORMATION

Contact Person at Public Body			
Official Name of the Public Body requesting the wage rates		Phone Number (<i>include Area Code</i>)	
Street Address		Email Address	
City	State	ZIP Code	

FUNDING INFORMATION

Will the federal government or any of its agencies furnish loans or grants for any part of the funds used in your contracts?

☐ Yes ☐ No

If "Yes," will the federal government or any of its agencies also prescribe a schedule of Prevailing Wage Rates?

☐ Yes ☐ No

COUNTY(IES) REQUESTED

Please list county(ies) requested: _____
(for St. Louis, please specify "County" or "City")

ANNUAL WAGE ORDER

The Annual Wage Order is accessible on the Division's website at www.labor.mo.gov/DLS/PrevailingWage.

Email address: _____

Requester Signature

Date of Request

*Missouri Department of Labor and Industrial Relations is an equal opportunity employer/program.
TDD/TTY: 800-735-2966 Relay Missouri: 711*



AFFIDAVIT

COMPLIANCE WITH THE PREVAILING WAGE LAW

I, _____, upon being duly sworn upon my oath state that: (1) I am the
(Name)

_____ of _____; (2) all requirements of
(Title) (Name of Company)

§§ 290.210 to 290.340, RSMo, pertaining to the payment of wages to workers employed on public works projects have been fully satisfied with regard to this company's work on _____;
(Name of Project)

(3) I have reviewed and am familiar with the prevailing wage rules in 8 CSR 30-3.010 to 8 CSR 30-3.060; (4) based upon my knowledge of these rules, including the occupational titles set out in 8 CSR 30-3.060, I have completed full and accurate records clearly indicating (a) the names, occupations, and crafts of every worker employed by this company in connection with this project together with an accurate record of the number of hours worked by each worker and the actual wages paid for each class or type of work performed, (b) the payroll deductions that have been made for each worker, and (c) the amounts paid to provide fringe benefits, if any, for each worker; (5) the amounts paid to provide fringe benefits, if any, were irrevocably made to a fund, plan, or program on behalf of the workers; (6) these payroll records are kept and have been provided for inspection to the authorized representative of the contracting public body and will be available, as often as may be necessary, to such body and the Missouri Department of Labor and Industrial Relations; (7) such records shall not be destroyed or removed from the state for one year following the completion of this company's work on this project; and (8) there has been no exception to the full and complete compliance with the provisions and requirements of Annual Wage Order No. _____ Section _____ issued by the Missouri Division of Labor Standards and applicable to this project located in _____ County, Missouri, and completed on the _____ day of _____, _____.

The matters stated herein are true to the best of my information, knowledge, and belief. I acknowledge that the falsification of any information set out above may subject me to criminal prosecution pursuant to §§290.340, 570.090, 575.040, 575.050, or 575.060, RSMo.

Signature

Subscribed and sworn to me this _____ day of _____, _____.

My commission expires _____, _____.

Notary Public

Receipt by Authorized Public Representative

SECTION 008400 - ATTACHMENTS

PART 1 - GENERAL

1.1 APPLICABLE AFFIDAVITS AND FORMS

- A. The electronic verification of work authorization, "E-Verify" form is bound hereinafter for Contractor's duplications and use.
- B. The OSHA "Affidavit of 10 Hour OSHA Training" is bound hereinafter for Contractor's duplication and use.
- C. "Contractor's Affidavit Concerning Drug/Alcohol Testing Program" form is bound hereinafter for Contractor's duplication and use.
- D. The "Missouri Service-Disabled Veteran Business Preference" form is bound hereinafter for Contractor's duplication and use.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 008400

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FEDERAL WORK AUTHORIZATION PROGRAM AFFIDAVIT

I, _____, being of legal age and having been duly sworn upon my oath, state the following facts are true:

1. I am more than twenty-one years of age; and have first-hand knowledge of the matters set forth herein.
2. I am employed by _____ (hereinafter "Company") and have authority to issue this affidavit on its behalf.
3. Company is enrolled in and participating in the United States E-Verify (formerly known as "Basic Pilot") federal work authorization program with respect to Company's employees working in connection with the services Company is providing to, or will provide to, the District, to the extent allowed by E-Verify.
4. Company does not knowingly employ any person who is an unauthorized alien in connection with the services the Company is providing to, or will provide to, the District.

FURTHER AFFIANT SAYETH NOT.

By: _____ (individual signature)

For: _____ (company name)

Title: _____

Subscribed and sworn to before me on this ____ day of _____, 20__.

NOTARY PUBLIC

My commission expires:

FEDERAL WORK AUTHORIZATION PROGRAM (“E-VERIFY”) ADDENDUM

Pursuant to Missouri Revised Statute 285.530, all business entities awarded any contract in excess of five thousand dollars (\$5,000) with a Missouri public school district must, as a condition to the award of any such contract, be enrolled and participate in a federal work authorization program with respect to the employees working in connection with the contracted services being provided, or to be provided, to the District (to the extent allowed by E-Verify). In addition, the business entity must affirm the same through sworn affidavit and provision of documentation. In addition, the business entity must sign an affidavit that it does not knowingly employ any person who is an unauthorized alien in connection with the services being provided, or to be provided, to the District.

Accordingly, your company:

- A. agrees to have an authorized person execute the attached “Federal Work Authorization Program Affidavit” attached hereto as Exhibit A and deliver the same to the District prior to or contemporaneously with the execution of its contract with the District;
- B. affirms it is enrolled in the “E-Verify” (formerly known as “Basic Pilot”) work authorization program of the United States, and are participating in E-Verify with respect to your employees working in connection with the services being provided (to the extent allowed by E-Verify), or to be provided, by your company to the District;
- C. affirms that it is not knowingly employing any person who is an unauthorized alien in connection with the services being provided, or to be provided, by your company to the District;
- D. affirms you will notify the District if you cease participation in E-Verify, or if there is any action, claim or complaint made against you alleging any violation of Missouri Revised Statute 285.530, or any regulations issued thereto;
- E. agrees to provide documentation of your participation in E-Verify to the District prior to or contemporaneously with the execution of its contract with the District (or at any time thereafter upon request by the District), by providing to the District an E-Verify screen print-out (or equivalent documentation) confirming your participation in E-Verify;
- F. agrees to comply with any state or federal regulations or rules that may be issued subsequent to this addendum that relate to Missouri Revised Statute 285.530; and
- G. agrees that any failure by your company to abide by the requirements a) through f) above will be considered a material breach of your contract with the District.

By: _____ (signature)

Printed Name and Title: _____

For and on behalf of: _____ (company name)

AFFIDAVIT OF 10 HOUR OSHA TRAINING

Comes now _____ as _____ first
Name Office Held

being duly sworn, on my oath, affirm _____ does
Company Name

comply with the requirements of Section 292.675, which requires all contractors and subcontractors doing work on the project to provide, and require its on-site employees to complete a ten-hour course in construction safety and health approved by the Occupational Safety and Health Administration (OSHA) or a similar program approved by the Missouri Department of Industrial Relations which is at least as stringent as an approve OSHA program.

In Affirmation thereof, the facts stated above are true and correct (The undersigned understands that false statements made in this filing are subject to the penalties provided under Section 292.675, RSMo).

Signature (person with authority)

Printed Name

Title

Date

Subscribed and sworn to before me this _____ of _____, 20__.

Signature of notary

Date

Contractor's Affidavit Concerning Drug/Alcohol Testing Program

STATE OF MISSOURI)
) ss
COUNTY OF)

COMES NOW the Affiant after having first been duly sworn and testifies as follows:

My name is _____. I hold the principal office of _____
for _____. I, the undersigned, being duly sworn, certify that
_____ is in compliance with the provisions of Missouri Revised Statute §
161.371; that _____ has established and implemented a random drug and
alcohol testing program as required by Missouri Revised Statute § 161.371 and any applicable
regulations. I further certify that _____ shall subcontract work only to
subcontractors meeting the requirements of Missouri Revised Statute § 161.371.

Name of Contractor

Address

City

State

By:_____

Subscribed and sworn to before me this ____ day of _____ 20__.

Notary Public

My Commission Expires:

MISSOURI SERVICE-DISABLED VETERAN BUSINESS ENTERPRISE (SDVE) APPLICATION FORM
BACKGROUND INFORMATION AND INSTRUCTIONS

BACKGROUND INFORMATION:

Pursuant to section 34.074, RSMo, and 1 CSR 40-1.050, the Division of Purchasing (Purchasing) has a goal of awarding three (3) percent of all contracts for the performance of any job or service to qualified service-disabled veteran business enterprises (SDVEs).

In addition, a three (3) bonus point preference shall be granted to a vendor who meets the requirements of a SDVE on bids/proposals for the performance of any job or service, except for a no cost contract and any other exception provided for (1 CSR 40-1.050) and as approved by the Director of Purchasing. The three (3) percent goal can be met, and the bonus points obtained, by a qualified SDVE vendor in non-weighted and weighted criteria procurements and/or through the use of qualified subcontractors or suppliers in weighted criteria procurements that provide at least three (3) percent of the total contract value.

Purchasing maintains and makes available a listing of qualified SDVEs to the public, including all potential vendors and contractors on Purchasing's website at <http://oa.mo.gov/sites/default/files/sdvelisting.pdf>.

An individual/business/organization interested in being added to the listing of qualified SDVEs may apply for consideration following the instructions below.

INSTRUCTIONS:

An individual/business/organization that meets the definitions of a service-disabled veteran and a service-disabled veteran business enterprise as defined in section 34.074, RSMo, (see definitions on the application form) and meets the standards of a qualifying SDVE pursuant to 1 CSR 40-1.050 (see standards on the application form), may complete and submit the application form along with copies of the required letter/discharge paper and documentation specified on the application form to Purchasing. Purchasing will review the completed application form and copies of the letter/discharge paper and documentation submitted to determine if the individual/business/organization qualifies as a SDVE in accordance with the standards stated on the application form.

SUBMIT APPLICATION FORM AND ACCOMPANYING DOCUMENTS TO THE DIVISION OF PURCHASING (Purchasing) BY E-MAIL, FAX, OR MAIL/COURIER:

SCAN AND E-MAIL TO:	PURCHMAIL@oa.mo.gov
FAX TO:	(573) 526-9815
MAIL TO:	PURCHASING, P.O. Box 809, Jefferson City, Mo 65102-0809
COURIER/DELIVER TO:	PURCHASING, 301 West High Street, Room 630, Jefferson City, Mo 65101-1517

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Work by Owner.
 - 4. Access to site.
 - 5. Coordination with occupants.
 - 6. Work restrictions.
 - 7. Specification and drawing conventions.
 - 8. Miscellaneous provisions.
- B. Related Requirements:
 - 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

- A. Project Identification:
 - 1. Project Number and Locations:
 - a. Sedalia Central Office Relocation - 1712 S. Lafayette Ave., Sedalia, Missouri 65301
- B. Owner: Sedalia School District 200
 - 1. Refer to Document 000105 "Project Team Directory."
- C. Architect:
 - 1. Refer to Document 000105 "Project Team Directory."
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. Refer to Document 000105 "Project Team Directory."

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. General: All demolition, sitework, architectural, structural, fire suppression, plumbing, mechanical, electrical, access control, technology and utilities as indicated in the Contract Documents and as further defined in the Scopes of Work.
 - 2. Alternates: Refer to Section 012300 "Alternates".
- B. Type of Contract:
 - 1. Project will be constructed under a single prime contract.

1.4 WORK BY OWNER

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

1.5 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.

1.6 OWNER-FURNISHED, CONTRACTOR INSTALLED PRODUCTS

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work required to install Owner-furnished Items.
- B. Contractor shall receive, store, secure and handle with reasonable care Owner Furnished Items after delivery thereof and shall install those items as recommended by manufacturer.

1.7 ACCESS TO SITE

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

1.8 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 7:00 a.m. to 4:00 p.m., Monday through Friday, unless otherwise indicated.
 - 1. Weekend Hours: Coordinate and schedule all weekend hours with the Owner not less than 48 hours in advance. Comply with regulations of authorities having jurisdiction.
 - 2. Early Morning Hours: Notify Owner of days when early morning hours will be required and comply with regulations of authorities having jurisdiction.
- 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 Architect and Owner not less than three (3) days in advance of proposed utility interruptions.
 - 2. Obtain Owner's 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 Architect and Owner not less than three (3) days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.

- E. Nonsmoking Buildings and Sites: Smoking is not permitted on School District property.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- G. Employee Identification: Provide 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 drug and background screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.
 - 2. As a condition for the award of any service contract in excess of \$5,000.00 by the Owner, the service provider must be enrolled in and currently participating in "E-Verify" or any other equivalent electronic verification of work authorization program operated by the U.S. Department of Homeland Security.
 - 3. As a further condition for the award of any service contract in excess of \$5,000.00 the service provider shall not knowingly employ any person who is an un-authorized alien in conjunction with the contracted services.
 - a. E-Verify forms are available for duplication and contractor's use in Section 008400 – Attachments.
- I. Fingerprinting Process: Comply with Owner's requirements for fingerprinting of Contractor personnel working on Project site.
 - 1. Fees: All fees associated with fingerprinting requirements shall be the responsibility of the Contractor.
 - a. Sedalia School District #200: Approximate Fee = \$41.75 per 1586 Non-Certified employee.
 - 2. Location: Fingerprinting locations shall be provided as indicated below.
 - a. Sedalia: Pettis County Sheriff's Department, 319 S. Lamine, Sedalia, MO
 - 3. Refer to "Finger Printing Instructions" document for Reference.

1.9 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 published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 011000

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**SEDALIA SCHOOL DISTRICT #200
2806 MATTHEW DRIVE – SEDALIA, MO 65301
660-829-6450**

**To be fingerprinted, you will need to register first following the instructions below.
The Site for Fingerprinting in Sedalia is**

**Pettis County Sheriff's Dept
319 S. Lamine
Open Monday – Friday – 9:00 am to 1:00 pm**

FINGERPRINTING FEE: \$41.75

HOW TO REGISTER PRIOR TO FINGERPRINTING

Internet Registration

1. Go to www.machs.mo.gov.
2. Click the blue icon "click here to register with the fingerprint portal".
3. Click the blue icon "click here to register with MACHS".
4. Enter the 4-digit registration number in the space provided. The 4-digit numbers are listed below. Enter the one that fits your type of employment for which you are being fingerprinted. Click enter.
 - 1584 – Certified Teacher
 - 1585 – Substitute Certificate (for Paraprofessionals)
 - 1586 – Non-Certified – not require a sub certificate
 - 1587 – Bus Drivers
5. Clicking "enter" will automatically return a message displaying the name and identifying information of the school district. If the school district information that populates is incorrect, please check that you have entered the correct 4-digit registration number.
6. Proceed by entering your personal demographic data into the spaces provided. Mandatory fields are marked by a red *. When you are finished, click "Register".
7. An 8-digit Transaction Control Number (TCN) will be displayed. This number will be used to track your fingerprints through the background check process.
8. Once you have verified that the information you have entered is correct, click "Complete Registration".
9. After reading thru the Noncriminal Justice Applicant's Privacy Rights, click "Complete Registration".
10. Confirm the person being fingerprinted is correct by clicking on "correct".
11. Click on the green icon register for Digital Fingerprinting Services
12. Fingerprinting locations will be displayed, click the blue words CLICK HERE.
13. The next screen will display the UEID # and the TCN #. Please print or record this in some fashion as you will need both numbers when you are fingerprinted.
14. Click on find a location and enter either a zip code, city and state, or airport code. Click Search.
15. Click on a location to view the days and hours the facility is open.

Sedalia School District #200 is an equal opportunity and affirmative action employer

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SECTION 012100 - 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. Lump-sum allowances.
- C. Related Requirements:
 - 1. Section 012200 "Unit Prices" for procedures for using unit prices.
 - 2. Section 014000 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.3 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 LUMP-SUM AND UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
 - 1. Sales and Use Taxes shall be omitted for this project.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner and/or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: For Unforeseen Conditions: Lump-Sum Allowance to include the sum of \$15,000.00 for Unforeseen Conditions.

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Section 014000 "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 (other than sales and use tax), overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. 23195 - Sedalia Central Office Relocation:
 - 1. Unit Price No. 01: Tuckpointing
 - a. Description: Tuckpointing of existing face brick.
 - b. Unit of Measurement: Square foot.
 - 2. Unit Price No. 02: Crack Fill.
 - a. Description: Provide asphalt crack repair according to Section 321216 "Asphalt Paving."
 - b. Unit of Measurement: Linear foot.
 - 3. Unit Price No. 03: Full Depth Repair (8")
 - a. Description: Provide full 6 inch depth asphalt repair according to Section 321216 "Asphalt Paving."
 - b. Unit of Measurement: Square yard.
 - 4. Unit Price 04: Edge Mill and Overlay.
 - a. Description: Edge mill asphalt paving and provide 2 inch thick asphalt overly according to Section 321216 "Asphalt Paving."

- b. Unit of Measurement: Square foot.
- 5. Unit Price 05: Concrete Removal and Replacement.
 - a. Description: Remove and offsite disposal of concrete and subsequent placement of new concrete to a thickness of 6 inches according to Sections 321313 "Concrete Paving" and Section 321373 "Concrete Paving Joint Sealants."
 - b. Unit of Measurement: Square foot.
- 6. Unit Price 06: Concrete Curb Removal and Replacement.
 - a. Description: Removal and offsite disposal of concrete curb and subsequent concrete curb replacement according to Section 321313 "Concrete Paving."
 - b. Unit of Measurement: Square foot.

END OF SECTION 012200

SECTION 012300 - 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. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 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. SEDALIA CENTRAL OFFICE RENOVATION
 - 1. Alternate No. 1: Board Room Ceiling
 - a. Alternate: Alternate includes all labor, materials, equipment and appurtenances necessary to provide CLG3 in place of CLG1 Ceiling clouds in the Boardroom. Refer to J1/A121.
 - b. Base Bid: Provide CLG1 Ceiling clouds in the Boardroom as shown in J9/A121.
 - 2. Alternate No. 2: Widening Existing Windows
 - a. Alternate No. 2: Alternate includes all labor, materials, equipment and appurtenances necessary to widen existing windows from 1'-4" to 3'-4" per details A7/A522, E7/A522, and J7/A522. Remove work associated with Sheet Note 10/A101.
 - 1) Provide price for replacing one (1) existing window.
 - 2) Provide price for replacing ten (10) existing windows.
 - 3) Provide price for replacing all nineteen (19) existing windows.

- b. Base Bid: Existing windows to remain. Replace Sealant all around per Sheet Note 10/A101.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for "Substitutions for Convenience" and "Substitutions for Cause".
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012200 "Unit Prices" for products selected under a unit price.
 - 3. Section 012300 "Alternates" for products selected under an alternate.
 - 4. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 5. Division 02 through 33 Sections for specific requirements and limitations for substitutions.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms. Substitutions for Cause shall be submitted after award of the contract as set forth hereinafter.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner. Substitutions for Convenience shall be submitted prior to bidding as set forth hereinafter.
- B. Comparable Products: Naming of specified items on the Drawings and in the specifications, means that such named items are specifically required by the Architect and/or Owner. When the words "or comparable product" follows such named item(s), a substitution request must be submitted when proposing a product other than the named product. Requests for substitutions must be received by the Architect within the time frame set hereinafter.
- C. The following are not considered substitutions:
 - 1. Revisions to Contract Documents requested by the Owner or Architect.
 - 2. Specified options of products, materials and construction methods included in the Contract Documents.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit at least one (1) paper copy or an electronic pdf copy of each request for consideration to the Architect. Clearly Identify proposed product and related options or fabrication or installation method to be replaced. Include Specification Section number and title, in addition to applicable Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided at the end of this Section.
 - a. Accompanying each Substitution Request shall be a fully executed copy of the Substitution Request Form.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Specifically indicate deviations, if any, from the Work specified in writing.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested, of proposed substitution and of specified product shall be submitted for comparison and review by Architect.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names, addresses and contact information of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Review Process: Submittal requests for proposed substitutions will be processed using the following procedures:
- a. Submittals will be "Received Dated" immediately upon arrival.
 - b. Submittals will be placed by receiving person in a file designated for that purpose.
 - c. Submittals will not be reviewed for completeness or compliance until after the date and time established for closing of receipt of substitution request submittals.
 - d. Submittals will be reviewed by a member of Hollis + Miller Architect's staff (or respective consultant). Reviewer(s) will not be designated until after closing period established for receipt of submittals.
 - e. Reviewer's General Attitude will be:
 - 1) Burden of Proof is on Proposer.
 - 2) Reviewer should not be required to complete the submittal, that is, select from options or between models and lines of products.
 - 3) Reviewer should not be required to conduct an exhaustive review of the submittal. Submittals of manufacturer's catalogs which do not clearly indicate proposed product and proposed product options will be rejected.
 - 4) Reviewer should not be required to seek information from manufacturer's literature on file in the office, from an improperly submitted electronic submittal or information in other locations.
 - 5) Substitute must be "comparable to" or superior in those features and performance which the Project requires and those which the specified product will provide.
 - 6) Review is complete when, in the reviewer's opinion, significant deficiency(ies) are established. In such case, review of data covering other points of specifications is not required.
 - f. Reviewer will note action taken (No Exception taken to Submitted Manufacturer, No Exception taken to Specific Product, Exceptions Noted, Not Accepted or Received Late), the date, and his/her initials.
 - g. All submittals received after closing time will be "Received Dated", marked "Late", initialed by reviewer, and filed without review.
 - h. Submittals will be filed in Architect's office until completion of the Project.
4. Architect's Action:
- a. Architect will review requests for "Substitutions for Convenience" only once, no additional information may be submitted. Architect may request additional information as necessary for review of "Substitutions for Cause."
 - b. Architect will note action taken.
 - c. Architect is not obligated nor required to review any and all substitution requests.
 - d. Architect is not obligated to inform proposers of substitutions of incomplete and non-accepted requests for substitution.
 - e. Acceptance of Substitutions:

- 1) Acceptance of Substitutions for Convenience: Accepted substitutions will be set forth in an Addendum and in no other manner.
 - (a) Use product specified if Architect does not issue a decision on use of a proposed substitution.
- 2) Acceptance of Substitutions for Cause: Architect will review proposed substitution within 15 business days of receipt of request. If necessary, Architect, will request additional information or documentation for evaluation within seven (7) business days of receipt of a request for Substitution for Cause." Architect will notify Contractor of acceptance of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later. **Only acceptable substitutions will receive notification of status. Substitutions shall be considered unacceptable unless a form of acceptance is received by the Proposer.**
 - (a) Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - (b) Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 ELECTRONIC SUBMITTAL OF SUBSTITUTIONS

- A. Substitution Request submittals will be accepted for review when submitted electronically under the following conditions. Substitution requests which are not submitted in accordance with the criteria listed below may be rejected at the Architect's discretion.
 1. Accompanying each submittal shall be a fully executed copy of the Substitution Request Form.
 2. Submittals shall be sent to Hollis + Miller Architects, to the attention of the contact listed in Document 000101 "Project Team Directory. Submittals directed to the attention of anyone other than the contact listed will not be considered.
 3. Submittals of Substitutions for Cause must be received within the time limits set forth in Paragraph 2.1 A of this Section.
 4. Submittals of Substitutions for Convenience must be received prior to bidding and within the time limits set forth in Paragraph 2.1 B of this Section.
 5. Documentation requirements as set forth in 1.3 A.2a through 1.3 A.2m are applicable to electronic submittals.
 - a. Note: Electronic submittals in which the manufacturer's entire catalog is submitted will be rejected.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than thirty (30) days prior to time required for preparation and review of related submittals.
 1. Conditions: Architect and Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Request is directly related to a "or comparable product" clause or similar language in the Contract Documents.

- c. Specified product or method of construction cannot be provided within the Contract Time.
 - d. Specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 - e. Specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution will provide the specified warranty.
 - f. Substitution request is fully documented and properly submitted.
 - g. Requested substitution will not adversely affect Contractor's construction schedule.
 - h. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - i. Requested substitution is compatible with other portions of the Work.
 - j. Requested substitution has been coordinated with other portions of the Work.
 - k. Requested substitution provides specified warranty.
 - l. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution only when submitted prior to bidding, and no later than 4:00 p.m. (local time) eight (8) calendar days prior to the date established for receipt of bids. Requests received after that time may be considered or rejected at discretion of Architect.
- 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- C. The Contractor's submittal and A/E's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptance or validate request for substitution, nor does it constitute approval.
- D. Under no circumstances does the Architect's and/or Owner's acceptance of any such substitution relieve the Contractor from timely, full and proper performance of the Work.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012500

SECTION 012501 - SUBSTITUTION PROCEDURES FORM

PROJECT: SEDALIA CENTRAL OFFICE- 1712 SOUTH LAFAYETTE AVENUE, SEDALIA, MO 65301

MAIL TO: HOLLIS + MILLER ARCHITECTS, 1828 WALNUT STREET SUITE 922, KANSAS CITY, MISSOURI 64108

SPECIFIED ITEM/ KEYNOTE #: _____

PROPOSED SUBSTITUTE: _____

SUBMITTED BY: _____

FIRM: _____

ADDRESS: _____

SIGNATURE: _____ **DATE:** _____

PHONE NUMBER: _____

ATTACH COMPLETE DESCRIPTION, DESIGNATION, CATALOG OR MODEL NUMBER, SPEC DATA SHEET AND OTHER TECHNICAL DATA AND SAMPLES, INCLUDING LABORATORY TESTS IF APPLICABLE.

FILL IN BLANKS BELOW:

1. WILL SUBSTITUTION AFFECT DIMENSION INDICATED ON DRAWINGS?
2. WILL SUBSTITUTION AFFECT WIRING, PIPING, DUCTWORK, ETC., INDICATED ON DRAWINGS?
3. WHAT EFFECT WILL SUBSTITUTION HAVE ON OTHER TRADES?
4. DIFFERENCES BETWEEN PROPOSED SUBSTITUTION AND SPECIFIED ITEM?

5. ANY AND ALL IMPACTS ON COSTS, DESIGN MODIFICATIONS, ADDITIONAL ARCHITECTURAL AND ENGINEERING SERVICES, MATERIAL AND LABOR CHANGES, SCHEDULE CHANGES, AND OTHER UNANTICIPATED CONSEQUENCES, RESULTING FROM THIS SUBSTITUTION IN LIEU OF THE SPECIFIED ITEM, SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR AND HIS SUBCONTRACTORS AND SUPPLIER.

6. MANUFACTURER'S WARRANTIES OF THE SPECIFIED ITEMS AND PROPOSED ITEMS ARE: ☐ SAME OR
☐ DIFFERENT, *EXPLAIN:* _____

REVIEW COMMENTS:

☐ **NO EXCEPTION TAKEN TO SUBMITTED MANUFACTURER**

MANUFACTURER ONLY IS ACCEPTED DUE TO TIME LIMITATIONS FOR FULL REVIEW OF PRODUCT, OR BECAUSE NO SPECIFIC PRODUCT DATA IS SUBMITTED, OR OTHER UNSPECIFIED REASONS. CONTRACTOR MUST STILL BEAR FULL RESPONSIBILITY FOR COMPLIANCE WITH CONTRACT REQUIREMENTS.

☐ **NO EXCEPTION TAKEN TO SPECIFIC PRODUCTS**

☐ **EXCEPTIONS NOTED**

SEE ATTACHED COPY OR NOTES ON PRODUCT LITERATURE

☐ **NOT ACCEPTED**

☐ **RECEIVED TOO LATE**

BY: _____ DATE: _____

REMARKS: _____

END OF SECTION

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use form acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.
 1. Change Orders are to be dated and numbered sequentially.
- B. Change Orders will describe the change or changes, will refer to the related Proposal Request number and date; and will be signed by the Owner and Architect.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for procedural requirements necessary to prepare and process Applications for Payment.
 - 2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 4. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.2 DEFINITIONS

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

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values coordinated with each phase of payment.
 - 4. Sub-schedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide sub-schedules showing values coordinated with each element.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.

- g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
- 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five (5) percent of the Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts Project closeout requirements in an amount totaling five (5) percent of the Contract Sum and subcontract amount.
- 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
- 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- 8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Architect by the 30th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment. Sample copies are included in Project Manual.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.

- b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from each, subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - 5. Waiver Forms: Submit executed waivers of lien on forms, included in the Project Manual.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Products list (preliminary if not final).
 - 5. Schedule of unit prices.
 - 6. Submittal schedule (preliminary if not final).
 - 7. List of Contractor's staff assignments.
 - 8. List of Contractor's principal consultants.
 - 9. Copies of building permits.
 - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 11. Initial progress report.
 - 12. Report of pre-construction conference.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707, "Consent of Surety to Final Payment."
 - 7. Evidence that all claims have been settled.
 - 8. Final liquidated damages settlement statement, if applicable.
 - 9. Copy of the Affidavit of Compliance with Prevailing Wage Determination sent to the State.
 - 10. Asbestos-Free and Lead-Free Certification Letter in form acceptable to Owner.
 - 11. Evidence that claims have been settled.
 - 12. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

13. Other close-out documentation required by the Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 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 meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

- A. RFI: Request from Owner, Architect, 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 form acceptable to Architect. 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 ten (10) 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. Keep list current at all times.
 - 1. Post paper copies of list in project meeting room, in temporary field office, and by each temporary telephone.

1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with 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 with other contractors 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. Refer to Section 017419 "Construction Waste Management and Disposal" for additional requirements.

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 Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
 - 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 - 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within 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 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: Architect 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 Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
 10. Coordination Drawing Prints: As deemed necessary by Construction Manager, prepare coordination drawing prints according to requirements in Section 013300 "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. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
 - a. Refer to individual Scopes of Work for Trades required to perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
 4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in Revit version 2024 using Windows 11 operating system.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.

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. Architect will return RFIs submitted to Architect 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 Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.

11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or a software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect 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 weekly in form acceptable to Architect. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. Name and address of Construction Manager.
 5. RFI number including RFIs that were returned without action or withdrawn.
 6. RFI description.
 7. Date the RFI was submitted to the Architect.
 8. Date Architect's response was received.
- F. On receipt of Architect's action, immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
1. Change in Work shall be recorded to the Project Record set per Section 017839 "Project Record Documents".

1.7 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three (3) days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.

2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; each 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.
 - 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 Architect and Owner's Commissioning Authority 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 Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, 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 Substantial 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 Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Owner's partial occupancy requirements.
 - k. Installation of Owner's furniture, fixtures, and equipment.
 - l. 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, Owner's Commissioning Authority and Architect, 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 regular 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, Architect, 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. Owner's Commissioning Authority and Architect will attend as deemed necessary.
 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 013100

SECTION 013200 - 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 013300 "Submittal Procedures" for submitting schedules and reports.
 - 2. Section 014529 "Testing and Inspections" 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. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
 - 1. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. 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. 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.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Daily Construction Reports: Submit at monthly intervals.
- F. Material Location Reports: Submit at monthly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Special Reports: Submit at time of unusual event.
 - 1. Adverse Weather Days: Document conditions effecting construction activities and submit within 24 hours of the event.

1.4 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "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 and interim milestones.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review submittal requirements and procedures.
 - 6. Review time required for review of submittals and resubmittals.
 - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 8. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
 - 9. Review and finalize list of construction activities to be included in schedule.
 - 10. 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 the Notice to Proceed 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 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than 20 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial 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, if any.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Uninterruptible services.
 - c. Use of premises restrictions.
 - d. Provisions for future construction.
 - e. Seasonal variations.
 - f. 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. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- 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 012900 "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.

2.2 STARTUP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven (7) days of date established for the Notice to Proceed or Notice of Award, whichever is earlier.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

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 the Notice to Proceed. 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 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 30 days after date established for the Notice to Proceed.
 - 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.
- 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.
- 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.

2.4 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 the Notice to Proceed or the Notice of Award, whichever is earlier. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.5 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. Substantial 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.

2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner and Architect within two 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. 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.
- B. 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 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
 - 2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Submit photos by uploading to web-based project software site or via email. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of location, vantage point, and direction.
 - g. Unique sequential identifier keyed to accompanying key plan.

1.3 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time from camera.
- D. File Names: Name media files with date, Project area, and sequential numbering suffix.

1.4 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.

- B. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take a minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take a minimum of 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Periodic Construction Photographs: Take a minimum of 20 photographs biweekly. Select vantage points to show status of construction and progress since last photographs were taken.
- D. Final Completion Construction Photographs: Take a minimum of 20 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 013233

SECTION 013300 - 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 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 3. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and Record Product Data.
 - 5. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Digital File Transfer: Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. A cloud based ShareFile exchange which allows internal and external users to access files.
- D. 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 Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. 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 Architect's final release or approval.

- g. Scheduled date of fabrication.
- h. Scheduled dates for installation.
- i. Scheduled dates for purchasing.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect to Contractor, at a nominal cost, for use in preparing submittals.
 - 1. Architect 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. Architect 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 Revit using Windows operating system. Verify current versions with Architect.
 - c. Contractor shall execute a data licensing agreement form furnished by the Architect.
- 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. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. It is expected that the number of submittals sent to the Architect and the Architect's Consultants within any one-week period will be reasonable in number as to not create "undue hardship."
 - 2. It is expected that all submittals will be submitted within the durations outlined in the bid form as provided by each trade.
 - a. A \$100.00 per calendar day penalty will be assessed for any submittal received after durations received as provided by each trade. The penalty will be deducted from the contract through deductive change order. Only if written authorization from the Architect to extend this time frame can this "per day" penalty not be enforced.
 - b. The completion time of the contract will not be extended for delays caused by tardiness of submittals. Cost of such delays shall not be borne by the Owner and may be back-charged as necessary.
 - 1) Contractor shall assume full responsibility for providing materials as specified at their risk to maintain schedule if submittals are not submitted within durations provided on the bid form.
 - c. Upon receipt of unapproved submittals, Contractors will have seven (7) calendar days to revise and resubmit. After such time, the penalty outlined above in 1.4 C.1.a will be assessed.
 - 3. Initial Review: Allow 10 **business** days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 4. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 5. Resubmittal Review: Allow 7 **business** days for review of each resubmittal.
 - 6. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 **business** days for initial review of each submittal.
 - 7. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 **business** days for review of each submittal. Submittal will be returned to Architect, 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., OMLC-079200.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., OMLC-079200.01.A).
 - b. Specific material/product identifier: After listing the project identifier and section number as described above, clearly indicate the material/product submitted corresponding to specific paragraph in the specification (e.g., Silicone Joint Sealant – 2.2 A).
- 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
- 4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or electronic form acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - 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, numbered consecutively.
 - p. Submittal and transmittal distribution record.
 - q. Other necessary identification.
 - r. Remarks.
- 5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- E. Options: Clearly identify options requiring selection by Architect.
- 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 Architect 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 Architect'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 Architect'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. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - b. Along with the electronic submittal, Contractor shall submit to the Architect, one (1) full sized hard copy of each shop drawing for review and approval, as deemed necessary by the Architect.
 - c. Along with the electronic submittal, contractors shall submit to the Architect, one (1) color deck or color card for each submittal requiring color selection for review, approval and color selection, as deemed necessary by the Architect.
 2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
 3. Submittals shall constitute an implied statement by the General Contractor and Subcontractor that the submitted items comply with the following statements:
 - a. Items have been reviewed and accepted by the General Contractor and Subcontractor.
 - b. Items have been verified and coordinated with specifications, measurements, conditions, and relevant criteria of the Contract Documents.
 - c. Items can be fabricated and delivered to the project site within the proposed project schedule.
 4. Review of submittals by the Architect and/or Owner shall not relive the Contractor from full compliance with the Construction Documents.
- 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 clearly 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/decks.
 - 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 and Shop Drawings, as applicable.
 6. Submit Product Data in the following format:
 - a. PDF electronic file according to Paragraph 2.1 A.1.
- 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 Architect'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, but no larger than 30 by 42 inches.

3. Submit Shop Drawings in the following format:
 - a. PDF electronic file according to Paragraph 2.1 A.1.
- 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. Sample for "initial selection" shall be listed as a separate item in the submittal schedule.
 - b. Number of Samples: Unless specifically required otherwise in Specification Section, submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
 7. Electronic Transmittal: Provide PDF transmittal for all physical Samples. Include digital image file illustrating Sample characteristics, and identification information for record.
- 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 013100 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

- H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."
- I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."
- J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- M. 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.
- N. 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.
- O. 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.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. 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.
- S. 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.
- T. 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.
- U. 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.
- V. 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.
- W. 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.

- X. 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 Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file in addition to three 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.
- C. BIM File Incorporation: Incorporate delegated-design drawing and data files into Building Information Model established for Project.
 - 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.

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 Architect.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "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 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear the Contractor's approval stamp and will return them without action.
- B. Action Submittals: Contractor is responsible for conforming and correlating dimensions at job sites for tolerances, clearances, quantities, fabrication processes, coordination of the Work with multiple trades, and full compliance with the Contract Documents. The Architect will review submittals for general conformance with the Contract Documents. Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action as follows:
 - 1. No Exception Taken: Signifies item represented in the submittal conforms to the design intent, complies with the intent of the Contract Documents and is acceptable for incorporation into the Work. Contractor is to proceed with fabrication or procurement and related work.

2. Exceptions Noted: Signifies item represented in the submittal conforms to the design concept, complies with the intent of the Contract Documents and is recommended for incorporation into the Work in accordance with the Architect's and/or Consultant's notations. Contractor is to proceed with the work in accordance the Architect's and/or Consultant's notations marked on the returned submittal or letter of transmittal. Resubmittal is not required.
 3. Revised and Resubmit: Signifies item represented in the submittal appears to conform to the design concept and comply with the intent of the Contract Documents, but information is either insufficient or contains discrepancies which prevent the Architect and/or his Consultant from completing his review. Contractor is to resubmit revised information. Fabrication or procurement of the item and related work is not to proceed until the submittal is acceptable.
 4. Not Accepted: Signifies item represented in the submittal does not conform to the design concept or comply with the intent of the Contract Documents and is not recommended for incorporation into the Work. Contractor shall submit items responsive to the Contract Documents.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300

SECTION 014000 - 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 Architect, Owner, Commissioning Authority 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 Architect.
- C. Mockups/Field Samples: Full-size physical assemblies that are constructed on-site. Mockups/field samples 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/Field Samples are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Integrated Field Samples: Field samples of select portions exterior envelope or interior construction erected as part of the Work. Field samples may consist of multiple products, assemblies, and subassemblies.
 - 2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
- 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, unless otherwise specified in the individual specification section, having successfully completed a minimum of five (5) 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 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 Architect.

1.4 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 Architect 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 Architect for a decision before proceeding.
 - 1. Whenever Contract Documents reasonably infer materials or installation as necessary to produce the intended results, but do not fully detail or specify such materials, the Contractor shall provide the more expensive method or material, or greater quantity, unless he has obtained a written decision from the Architect.

1.5 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups/field samples, 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.
- B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement 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, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. 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 Architect.
 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- C. 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.
- D. 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.

1.7 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 Architect. 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.
- 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, including tests and inspections indicated to be performed by the Commissioning Authority.
- 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 Architect 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.

1.8 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.

1.9 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.
1. Refer to individual specification sections for additional requirements.
- 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 Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- 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 Architect.
 - 2. Notify Architect 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 Architect'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. Unless otherwise indicated in the Contract Documents, demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.
- M. Field Samples: Construct/apply field samples using required materials, products, finishes and assemblies, finished according to requirements for the completed work. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work:
 - 1. Build field sample of size indicated or, if not indicated, as directed by Architect.

2. Notify Architect three (3) days in advance of dates and times when field samples will be constructed/applied.
3. Notify Architect seven (7) days in advance of dates and times when field sample will be constructed/applied.
4. Demonstrate the proposed aesthetic effects and workmanship to be incorporated into the Work.
5. Obtain Architect's approval of field sample before starting remainder of work.
 - a. Allow three (3) days for initial review and each re-review of each field sample.
6. Field samples not acceptable to Architect shall be re-constructed/re-applied until field sample is accepted to Architect.
7. Maintain field sample during construction in an undisturbed condition as a standard for judging the completed Work
8. Unless otherwise indicated in the Contract Documents, dispose of field sample when directed by Architect and Owner.

1.10 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. 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 24 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 013300 "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 Architect, Commissioning Authority, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect, Commissioning Authority, 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, Architect, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, 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 Architect, Commissioning Authority, 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 Architect and Commissioning Authority, with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial 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 Architect.

4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, and Commissioning Authority'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 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 GENERAL

1.1 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 in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC - Associated Air Balance Council; www.aabc.com
 - 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 - 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.

7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWWA - American Water Works Association; www.awwa.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.bwfbadminton.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.compositepanel.org.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.

65. CSI - Construction Specifications Institute (The); www.csiresources.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsintstitute.org.
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.
84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarooft.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.
88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; www.iec.ch.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.

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

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

- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
 3. DSCC - Defense Supply Center Columbus; (See FS).
 4. FED-STD - Federal Standard; (See FS).
 5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
 6. MILSPEC - Military Specification and Standards; (See DOD).
 7. USAB - United States Access Board; www.access-board.gov.
 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 3. CDHS; California Department of Health Services; (See CDPH).
 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservation.tamu.edu.
 8. Colorado Department of Public Health & Environment; www.colorado.gov/pacific/cdphe
 9. Colorado Air Quality Control Commission; www.colorado.gov/pacific/cdphe/aqcc
 10. Colorado Water Quality Control Division; www.colorado.gov/pacific/cdphe/wqcd
 11. Colorado Geological Survey; Land Use Regulations; www.coloradogeologicalsurvey.org/land-use-regulations/

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 014200

SECTION 014529 - TESTING AND INSPECTIONS

PART 1 - GENERAL

1.1 GENERAL

- A. The preceding "General Conditions" are a part of these specifications and the Contractor shall consult them in detail in connection with this part of the work.

1.2 SCOPE OF WORK

- A. Employment of a testing and inspection firm approved and paid for by the Owner. Approximate scope of testing and inspection shall be as indicated on the drawings and herein specified in the sections of the specifications.
 - 1. Refer to attachment for scope of testing to be provided by Owner.

1.3 TESTING AND INSPECTION CHARGES

- A. For the following conditions, costs of testing and inspection services shall be paid for by the Contractor, apart from the Testing and Inspection.
 - 1. Costs arising from errors or omissions by the Contractor.
 - 2. Costs of concrete cores, of re-testing materials that fail, and of required identification of materials (mill tests, manufacturers certifications, etc.).
 - 3. Costs of test and inspections required to expedite the Contractors operations.

1.4 EARTHWORK

- A. The Soils Engineer shall be notified for inspection by the Contractor and shall work in cooperation with the Architect. This inspection shall be made before any excavation is attempted on the site. If any undesirable conditions are encountered during Construction, the Soils Engineer shall be notified so that supplemental recommendations can be made. Tests shall be made to define maximum densities of all compaction work. All densities shall be expressed as a relative compaction, in terms of the maximum dry density obtained in the laboratory. The Soils Engineer shall supervise all engineered fill, and make field tests to insure compliance with the required placement of footings; methods of placing and compacting fills; filter and/or rock fill materials.

1.5 CONCRETE WORK

- A. Reinforcement shall be positively identified by heat numbers and mill analysis. Otherwise, Contractor shall provide test by qualified laboratory, one test for each 5 tons or fraction thereof, each size and type of reinforcing steel. Cement shall be from tested bins and properly identified at the mixing plant. Contractor shall provide to the testing laboratory, aggregate samples for approval. Testing laboratory shall prepare 3 concrete cylinders for each 25 cubic yards, or fraction thereof placed – 2 cylinders to be tested at 7 days, and 1 cylinder at 28 days. Follow ASTM standards throughout.

1.6 GENERAL TESTS AND INSPECTIONS

- A. Observe all building code test and inspection requirements. Notify proper State, County and City authorities, for their required inspections.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 014529

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Section 321216 "Asphalt Paving" for construction and maintenance of asphalt pavement for temporary roads and paved areas.

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, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
 - 1. Sewer service excludes temporary toilets.
 - 2. Owner will not pay for "bulk water" used during duration of construction.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
 - 1. Contractor shall make his/her own provisions for and pay for power used for on-site welding.
- D. Use of sanitary sewer is permitted for normal wastewater only.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Plan: Locations for temporary facilities, utility hookups, staging areas, and parking areas for construction personnel are indicated on the Civil Drawings.
- B. Erosion- and Sedimentation-Control Plan: Civil Drawings show a "general" 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 authorities having jurisdiction. 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 and plastering, and concrete 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, whichever is more stringent.

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. General: Contractor's option to provide one of the following types of chain-link fencing:
 - 1. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts.
 - 2. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- C. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- D. 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. Common-Use Field Office: Field office shall be of sufficient size to accommodate needs of Owner, Architect, 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. Desk for Architect, duplex outlet and internet access.

2. Conference room of sufficient size to accommodate meetings of at least 10 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- 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.
 6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Owner authorizes use of permanent HVAC systems. Where permanent HVAC systems have not been installed, 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 017700 "Closeout Procedures".
 4. De-Humidification Units: Listed and labeled for the area and volume of spaces to be dehumidified, with individual controls for monitoring environmental humidity levels.
- 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.
- 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 as directed by authorities having jurisdiction.
 2. Contractor shall be responsible for full costs of cleanout and correction of related damages due to blockages.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- D. 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.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed 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.
- F. 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.
- G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
 - 1. Provide electric distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 2. Connect temporary service to Owner's existing power source, as directed by Owner.
 - 3. Where capacity of existing system does not meet requirements for construction operations, provide additional electric power service.
- H. 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.
- I. Telephone Service: Superintendent shall be available via cellular telephone from the hours of 7:00 am to 5:00 pm.
 - 1. Contractor's Telephone Service: Contractors shall be available during construction via cellular telephone.
 - 2. At each telephone in common-use facilities, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's field and home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.

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 of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

- B. 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 according to Section 312000 "Earth Moving."
 - 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
- C. 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.
- D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- E. 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.
- F. 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.
- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- H. 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.
- I. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- K. 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 Substantial 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.
 - 1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of current EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements set forth in approved Storm Water Pollution Prevention Plan (SWPPP).
- 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.
 - 1. Refer to approved Storm Water Pollution Prevention Plan (SWPPP).
- 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 Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- G. Site Enclosure Fence: Prior to commencing earthwork, 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 indicated on Drawings.
- 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 occupied areas from fumes and noise as deemed necessary by Architect and Owner.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 3. Insulate partitions to control noise transmission to occupied areas.
 - 4. Provide foam gasketing, attached to framing and not to construction to remain, to seal joints and perimeter of temporary partition. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 5. Protect air-handling equipment.
 - 6. Provide walk-off mats at each entrance through temporary partition.
- 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 TEMPORARY SEEDING INSTALLATION

- A. General: Temporary seeding is the establishment of fast growing annual vegetation to provide erosion control for up to twelve (12) months and reduce the amount of sediment moving off the site. Annual plants, which sprout rapidly and survive for only one growing season are suitable for establishing temporary vegetation cover. This practice applies where short-lived vegetation can be established before final grading or in a season not suitable for permanent seeding.
- B. Seed: All seed shall conform to Federal Specification JJJ-S-1816. Provide fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Furnish seed on sealed standard containers, labeled in accordance with U.S. Department of Agriculture Rules and Regulations under current Federal Seed Act.
 1. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable.
- C. Temporary Seed: Provide seed mixture composed of plant species, proportions and minimum percentages of purity, germination and maximum percentage of weed seed as follows for each seed mix:
 1. LBs / Acre - 120
 2. % Purity - 98
 3. % Germ - 85
- D. The preferred method of seeding would be drills for wheat and slit seeding for rye. Sow seed using a slit seeding machine or spreader at 2" centers. Do not seed when wind velocity exceeds 15 miles per hour.
- E. Protect all seeded areas with straw mulch as follows:
 1. The contractor shall straw mulch all seeded areas. The straw shall be free of weed seed and such foreign materials that may detract from the effectiveness as mulch, erosion control or impede desired plant growth.
 2. Immediately or within twenty-four (24) hours after any given area is seeded, straw shall be evenly placed with a mechanical blower or by hand over all seeded areas at the rate of approximately one and one-half (1-1/2) tons per acre. The proper mulch application when viewed straight down shall appear to be 50% mulch and 50% of the soil surface below. Crimp straw into soil by mechanical means.
 3. Any seedbed areas or other work which was damaged as a result of applying the mulch shall be repaired at the discretion of the Architect or Landscape Architect.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction 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 Architect.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. 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 Substantial 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 Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. 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 Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 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 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012200 "Unit Prices" for products selected under a unit price.
 - 3. Section 012300 "Alternates" for products selected under an alternate.
 - 4. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 5. Section 014200 "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.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications.

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. Architects Action: For comparable products submitted for "Cause", if necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later. For comparable products submitted for "Contractor's Convenience", Contractor must submit all information necessary to make a direct comparison to specified product for Architect's review, no additional information may be submitted.
 - a. Form of Approval: As specified in Section 012500 "Substitution Procedures."

- b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 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. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

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 017700 "Closeout Procedures."

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. 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," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
 1. 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 be considered prior to bidding only.
 - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 2. 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 be considered prior to bidding only.
 - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 3. 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 Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that 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 architects and owners, if requested.
 5. Samples, if requested.

PART 3 EXECUTION (NOT USED)

END OF SECTION 016000

SECTION 017300 - 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 the Work.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 013300 "Submittal Procedures" for submitting surveys.
 - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
 - 5. Section 078413 "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 land surveyor or professional engineer.
- B. Certificates: Contractor shall certify that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit one paper copy and one electronic copy, signed by professional engineer.

1.4 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 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 Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor or 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 lines and levels of construction and elsewhere as needed to locate work for the Project.
 - 4. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 5. Inform installers of lines and levels to which they must comply.
 - 6. Check the location, level and plumb, of every major element as the Work progresses.
 - 7. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 8. 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 Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. 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.
- C. 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.

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 in occupied spaces and 90 inches 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 Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: 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 Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- K. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective work.

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 material 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. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- F. 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.
- G. 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.
- H. Patching and Repairing Existing Roof:
- 1. Report discrepancies to Architect and Owner before disturbing existing conditions that could affect current warranty.
 - 2. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
 - 3. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - a. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.
 - 6. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during patching and repairing operations, by methods and with materials so as not to void existing warranties. Contractor to confirm materials used will not void existing warranties.
- 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.
 - 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 Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "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 Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to 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. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
 - 1. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
 - 2. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "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 Substantial Completion.
 - 1. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition waste.
 - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- E. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- B. 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.

1.4 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 3. Store items in a secure area until installation.
 4. Protect items from damage during transport and storage.
 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 1. Clean salvaged items.
 2. Store items in a secure area until delivery to Owner.
 3. Transport items to Owner's storage area designated by Owner.
- C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- E. Plumbing Fixtures: Separate by type and size.
- F. Lighting Fixtures: Separate lamps by type and protect from breakage.
- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 DISPOSAL OF WASTE

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

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for progress cleaning of Project site.
 - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting record Drawings and record Product Data.
 - 4. Section 017900 "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 Substantial 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 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. 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, damage or settlement surveys, property surveys, and similar final record information.

3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number 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 Architect'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 Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "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 Substantial Completion a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. 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 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit 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, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. 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.
 - 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 Architect
 - d. Name of Contractor.
 - e. Page number.
 - 4. Submit list of incomplete items in the following format:
 - a. PDF electronic file. Architect will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 - 1. General: Provide one (1) electronic copy and one (1) paper copy of warranties.
 - 2. Bind warranties and bonds in heavy-duty, three-ring, white vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 3. 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.
 - 4. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 - 5. 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.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.9 PROJECT CLOSEOUT CHECK LIST

- A. Requirements: Contractor must provide the following prior to the Architect and Construction Manager approving the release of final payment:
 - 1. Verification that final punch list is complete.
 - 2. Final Affidavit.
 - 3. Consent of Surety.
 - 4. Final Lien Waiver.
 - 5. Affidavit of compliance with Prevailing Wage requirements.
 - 6. As-Built drawings applicable to this Contract.
 - 7. Operation and Maintenance Manuals applicable to this Contract.
 - 8. Current Insurance Certificate.

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 Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. Remove snow and ice to provide safe access to building, as applicable.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. 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.
 - j. Remove labels that are not permanent.
 - k. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

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SECTION 017823 - 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 013300 "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. Architect and Commissioning Authority, as applicable, 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. General: Provide one (1) pdf electronic file and one (1) paper copy as follows:
 - a. PDF electronic file: Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - 1) Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - 2) Enable inserted reviewer comments on draft submittals.
 - b. Paper copy: Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will transmit paper copy to Owner upon acceptance.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least thirty (30) days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's and, as applicable, Commissioning Authority's comments. Submit copies of each corrected manual within ten (10) days of receipt of Architect's and Commissioning Authority'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. General: Submit one (1) paper copy and one (1) copy in pdf electronic file format.
- B. 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.
- C. 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 and Installer (if applicable).
 - 6. Name and contact information for Architect.
 - 7. Name and contact information for Commissioning Authority, as applicable.
 - 8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 9. Cross-reference to related systems in other operation and maintenance manuals.
- D. 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.
- E. 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.

- F. 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.
- G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
 - 1. Binders: Heavy-duty, three-ring, white vinyl-covered, post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, 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 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. Flood.
 - 4. Gas leak.
 - 5. Water leak.
 - 6. Power failure.
 - 7. Water outage.
 - 8. System, subsystem, or equipment failure.
 - 9. 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 017839 "Project Record Documents."
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for final property survey.
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

- A. General: Final Payment will not be made until Project Record Documents are submitted to, reviewed by and are acceptable to the Architect.
- B. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Architect 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 (1) paper-copy set of marked-up record prints.
 - 2) Print each drawing, whether or not changes and additional information were recorded.
- C. Record Specifications: Comply with the following:
 - 1. Initial Submittal:
 - a. Submit one paper-copy set(s) of marked-up record specifications.
 - b. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - 2. Final Submittal:
 - a. Submit PDF electronic files of scanned and marked-up record specifications.
- D. Record Product Data: Submit one (1) paper copy and one (1) annotated PDF electronic file and directory 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.
- E. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one (1) paper copy and one (1) annotated PDF electronic file and directory of each submittal.
- F. Reports: Submit written report weekly, 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 (1) 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.
 - 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 Architect'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:
 - 1. Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
 - a. Format: Annotated PDF electronic file with comment function enabled.
 - b. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 - c. Refer instances of uncertainty to Architect for resolution.
 - d. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - 1) See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
 - 2) Architect will provide data file layer information. Record markups in separate layers.
- C. 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 Architect.
 - 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: Refer to previous Article.

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 and record Drawings where applicable.
- B. Format: Submit one (1) copy of record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
 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 one PDF electronic file and a separate paper copy of marked-up miscellaneous record submittals].
 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 Architect's reference during normal working hours.

END OF SECTION 017839 017839

SECTION 017900 - 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.
 - 3. Pre-Produced demonstration and training videos.

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 (pre-produced) demonstration and training video recordings for systems, equipment, and products.
- B. Qualifications: For Instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.3 CLOSEOUT SUBMITTALS

- A. Pre-Produced Demonstration and Training Video Recordings: Submit two (2) copies within seven days of end of training.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name of Architect.
 - c. Name of Contractor.
 - d. Date of video recording.
 - e. Name and address of videographer.
 - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
 - 3. At completion of training, submit complete training manual(s) for Owner's use. One copy shall be prepared and bound in format matching operation and maintenance manuals, and the second copy shall be in PDF electronic file format on compact disc.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- C. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "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 Architect.

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 and shutdown 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 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Coordinate with Owner for number of participants, instruction times and location.
 - 2. Describe system design, operational requirements, criteria and regulatory requirements.
 - 3. Owner will furnish Contractor with names and positions of participants.
 - a. Owner will have in attendance a participant to describe Owner's operational philosophy.
- C. 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, with at least seven (7) days' advance notice.
 - a. Notify Architect in writing of training schedule.
- D. 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.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. Pre-Produced Video Recordings. Video recordings may be used as a component of each training module. Upon completion of training, furnish to Owner one (1) copy of each video used for training.

END OF SECTION 017900

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure as indicated, and as required to accommodate new construction.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 017300 "Execution" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. 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.
 - 1. Owner will retain "first right of refusal" for all demolished items.
- 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. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- C. 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 to ensure uninterrupted progress of Owner's on-site operations and of Owner's partial occupancy of completed Work.
- D. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.
 - 1. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.
- E. 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.
- F. 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. Prior to commencement of demolition, representatives of the Owner and the Contractor will inspect the project areas where work will be conducted, and designate items to be salvaged. Items to be salvaged shall be identified by tagging/labeling and listed on the inventory.

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.
 - 1. Before selective demolition, Owner will remove the following items:
- 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. Hazardous materials will be removed by Owner before the start of Work.

- a. Scheduling and phasing of hazardous materials removal shall be conducted prior to start of work in consultation with Contractor and Owner's forces. It may be necessary for portions of hazardous materials removal to occur after the start of construction. In such cases, areas where hazardous materials removal occurs shall be abandoned by Contractor during removal until hazardous materials removal is complete.
 - 2. 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.
 - 3. Contractor and Owner's forces shall each conduct work according to all applicable OSHA and EPA regulations.
- 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.
- 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. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."
 - 2. 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 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary"
- 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. Arrange to shut off utilities with utility companies.
 - 3. 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.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.
- C. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

- A. 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.
 - 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: 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 Division 01 Section "Temporary Facilities and Controls."
- C. 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. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- D. Temporary Shoring: 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.
- E. Remove temporary barricades and protections where hazards no longer exist.

3.4 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 adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Locate temporary wall/knockout panels and remove to extent indicated, minimizing damage to existing adjacent construction to remain.
 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. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- E. 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.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. 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.
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.
- F. Wood Trim and Plaster: Carefully remove wood trim adjacent to interior plaster work to minimize damage to plaster work to remain. Remove loose plaster back to solid/sound plaster.

3.6 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 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.7 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 024119

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel reinforcement bars.
 - 2. Welded-wire reinforcement.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of steel reinforcement.
 - 2. Bar supports.
- B. Shop Drawings: Comply with ACI SP-066:
 - 1. Include placing drawings that detail fabrication, bending, and placement.
 - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed.

- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

2.3 FABRICATING REINFORCEMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Splices: Lap splices as indicated on Drawings.
 - 1. Stagger splices in accordance with ACI 318.
- F. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.

2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
3. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement.
 2. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 1. Steel-reinforcement placement.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete standards.
2. Concrete materials.
3. Admixtures.
4. Curing materials.
5. Concrete mixture materials.
6. Concrete mixture class type.
7. Concrete mixing.

B. Related Requirements:

1. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement or blended hydraulic cement alone or in combination with one or more of the following:

1. Fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cementitious Materials (w/cm) Ratio: The ratio by weight of mixing water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Blended Hydraulic Cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:
 - a. Include limitations of use. Admixtures that do not comply with reference ASTM International requirements must be submitted with test data for approval.
5. Vapor retarders.
6. Curing materials.
 - a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.
7. Joint fillers.
8. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Compressive strength at 28 days or other age as specified.
3. Compressive strength required at stages of construction.
4. Durability exposure classes for Exposure Categories F, S, W, and C.
5. Maximum w/cm ratio.
6. Slump or slump flow limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Intended placement method.
10. Submit adjustments to design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant changes.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

D. Samples: For vapor retarder.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Testing Agency: Include documentation indicating compliance with ASTM E329 or ASTM C1077 and copies of applicable ACI certificates for testing technicians or ACI Concrete Construction Special Inspector - MH, ASCC.

B. Material Certificates: For each of the following:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Vapor retarders.
5. Joint-filler strips.
6. Repair materials.

C. Material Test Reports: For the following:

1. Blended Hydraulic Cement.
2. Fly ash.
3. Aggregates.
4. Admixtures.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified Installer who employs Project personnel qualified as an ACI-certified Concrete Flatwork Associate and Concrete Flatwork Finisher and a supervisor who is a certified ACI Advanced Concrete Flatwork Finisher/Technician or an ACI Concrete Flatwork Finisher with experience installing and finishing concrete.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment.
 - 1. Manufacturer's production facilities and delivery vehicles certified in accordance with NRMCA's certification requirements or equivalent approval by a State DOT.
- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing that performs duties on behalf of the Architect/Engineer.
 - 1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Level 1. Testing agency laboratory supervisor tests to be an ACI-certified Concrete Laboratory Testing Technician, Level 2.
- D. Field Quality-Control Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
 - 1. Personnel conducting field tests on plastic concrete properties are to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with policies from ACI CPP 610.1 or an equivalent certification program.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94 and ACI 301.

1.7 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 as follows:
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When air temperature has fallen to, or is expected to fall below 40 deg F during the protection period, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 - 1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE STANDARDS

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

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Blended Hydraulic Cement: ASTM C595/C595M, Type IL, portland-limestone cement.
2. Pozzolans: ASTM C618, Class C, F, or N.

C. Normal-Weight Aggregates:

1. Coarse Aggregate: ASTM C33, Class 1N
2. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
3. Fine Aggregate: ASTM C33.
4. Recycled Aggregate: Provide documentation of characteristics of recycled aggregate and mechanical properties and durability of proposed concrete, which incorporates recycled aggregate to conform to applicable requirements for the class of concrete.
5. Alkali-Silica Reaction: Comply with one of the following for each aggregate used:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567. Do not use this option with fly ash with an alkali content greater than 4.0 percent. Submit supporting data for each aggregate showing expansion in excess of 0.10 percent when tested in accordance with ASTM C1260.
 - c. Alkali Content in Concrete: Not to exceed 4 lb./cu. yd. for aggregate with expansion greater than or equal to 0.04 percent and less than 0.12 percent or 3 lb./cu. yd. for aggregate with expansion greater than or equal to 0.12 percent and less than 0.24 percent. Test aggregate reactivity in accordance with ASTM C1293. Calculate alkali content of concrete in accordance with ACI 301. Do not use this option with natural pozzolan or fly ash that has a calcium oxide content greater than 18 percent or an alkali content greater than 4.0 percent; or for an aggregate with expansion at one year greater than or equal to 0.24 percent when tested in accordance with ASTM C1293.

2.3 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260.

- B. Chemical Admixtures: Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.

6. Admixtures with special properties, with documentation of claimed performance enhancement, ASTM C494/C494M, Type S.
- C. Mixing Water for Concrete Mixtures and Water Used to Make Ice: ASTM C1602. Include documentation of compliance with limits for alkalis, sulfates, chlorides, or solids content of mixing water from Table 2 in ASTM C1602.

2.4 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
- D. Curing Paper: 8 ft. wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.
- E. Water: Potable water that does not cause staining of the surface.

2.5 CONCRETE MIXTURE MATERIALS

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland or hydraulic cement in concrete assigned to Exposure Class F3 as follows:
 1. Fly Ash or Other Pozzolans: 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

2.6 CONCRETE MIXTURE CLASS TYPES

- A. Normal-weight concrete.
 1. Exposure Class: ACI 318 Class F1 Class S0 Class W0 Class C2.
 2. Minimum Compressive Strength: 4000 psi at days.
 3. Slump Limit: 4 inches, plus or minus 1 inch for concrete.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish delivery ticket.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

2.8 LIQUID FLOOR TREATMENTS (033000.A21)

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces, while improving slip resistance.
 1. Basis-of-Design Products: Subject to compliance with requirements, provide Curecrete Distribution Inc.; "Ashford Formula" or comparable product meeting specified performance requirements, submitted to and accepted by Architect prior to bidding.
 2. Performance Criteria:
 - a. Abrasion Resistance: Improves abrasion resistance by not less than 30 percent over untreated concrete when tested in accordance with ASTM C 779.
 - b. Coefficient of Friction: ASTM C 1028, on steel-troweled concrete samples versus tile, reduces slippage as follows:
 - 1) Dry: 0.71 untreated and with treatment not less than 0.86.
 - 2) Wet: 0.47 untreated and with treatment not less than 0.69.
 - c. Hardening: Improves hardness by not less than 35 percent over untreated concrete when tested in accordance with ASTM C 39 after 28 days/
 - d. Impact Resistance: Improves impact resistance by not less than 13 percent over untreated concrete when tested in accordance with ASTM C 805, rebound number.
 3. Basis-of-Design Products: Subject to compliance with requirements, provide Prosoco, Inc.; "Consolideck LS" or comparable product meeting specified performance requirements, submitted to and accepted by Architect prior to bidding.
 - a. Description: Clear premium sealer, hardener and densifier. This penetrating lithium silicate treatment reacts with the concrete to produce insoluble calcium silicate hydrate within the concrete pores. The treated surfaces resist damage from water and surface abrasion. The increased surface hardness reduces dusting and simplifies maintenance.
 - b. Performance Criteria:
 - 1) Form: Clear, colorless, odorless liquid.
 - 2) Specific Gravity: 1.10.
 - 3) pH: 11.0.
 - 4) Weight per Gallon: 9.2 pounds.
 - 5) Active Content: 14.5 percent.
 - 6) Total Solids: 14.5 percent.
 - 7) Flash Point: Not applicable.
 - 8) Freeze Point: 32 degrees Fahrenheit (0 degrees Celsius)
 - 9) Shelf Life: 2 years in unopened, factory-sealed container.
 - 10) VOC Content: 0 grams per liter. Complies with all known national, state, and district AIM VOC regulations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 1. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.

2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 1. Daily access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 TOLERANCES

- A. Comply with ACI 117.

3.4 INSTALLATION OF CAST-IN-PLACE CONCRETE

- A. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- B. Water addition in transit or at the Project site must be in accordance with ASTM C94 and must not exceed the permitted amount indicated on the concrete delivery ticket.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

3.5 APPLICATION OF FINISHING SLABS

- A. Scratch Finish:
 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
 3. Apply scratch finish to surfaces.
- B. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish.

C. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance.
3. Do not add water to concrete surface. Use of an approved finishing aid is acceptable.
4. Do not apply troweled finish to concrete, which has a total air content greater than 3 percent.
5. Apply a trowel finish to surfaces exposed to view.

D. Trowel and Fine-Broom Finish: First apply a trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

3.6 APPLICATION OF CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305R, before and during finishing operations.

B. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.

- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following not in cold weather:
 - a) Water.
 - b) Continuous water-fog spray.

3.7 INSTALLATION OF JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least **[one] [six]** month(s).
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.8 INSTALLATION OF CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 1. Repair and patch defective areas when approved by Architect.
 2. Remove and replace concrete that cannot be repaired and patched to meet specification requirements.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Unformed Surfaces:
 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width.
 3. After concrete has cured at least 14 days, correct high areas by grinding.
 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by adding patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.

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

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 1. Testing agency to be responsible for providing curing facility for initial curing of strength test specimens on-site and verifying that test specimens are cured in accordance with standard curing requirements in ASTM C31/C31M.
 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.

- 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results of fresh concrete, including slump or slump flow, air content, temperature and density.
 - 13) Information on storage and curing of samples at the Project site, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
4. Provide a space and source of power or other resources for curing and access to test specimens by the testing agency.
- C. Delivery Tickets: comply with ASTM C94.
- D. Inspections:
1. Verification of use of required design mixture.
 2. Concrete placement, including conveying and depositing.
 3. Curing procedures and maintenance of curing temperature.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 150 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing is to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143/C143M:
 - a. One test at point of delivery for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests as needed.
 3. Slump Flow: ASTM C1611:
 - a. One test at point of delivery for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests as needed.
 4. Air Content: ASTM C231 pressure method, for normal-weight concrete;.
 - a. One test for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each concrete mixture.
 5. Concrete Temperature: ASTM C1064:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample when strength test specimens are cast.
 6. Concrete Density: ASTM C138:

- a. One test for each composite sample when strength test specimens are cast.
7. Compression Test Specimens: ASTM C31:
- a. Cast and standard cure two sets of [two] [three] [four] 6 inches by 12-inches or 4-inch by 8-inch cylindrical specimens for each composite sample.
 - b. Cast, and field cure [two] <Insert number> sets of [two] [three] [four] standard cylindrical specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C39.
- a. Test one set of [two] [three] [four] standard cured specimens at seven days and one set of two specimens at 28 [other age] days.
 - b. Test one set of [two] [three] [four] field-cured specimens at seven days and one set of two specimens at 28 days.
 - c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests of standard cured cylinders equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests:
- a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
- 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.7.6.3.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.10 PROTECTION

A. Protect concrete surfaces as follows:

- 1. Protect from petroleum stains.
- 2. Diaper hydraulic equipment used over concrete surfaces.
- 3. Prohibit vehicles from interior concrete slabs.
- 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
- 5. Prohibit placement of steel items on concrete surfaces.
- 6. Prohibit use of acids or acidic detergents over concrete surfaces.

7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using floor slab protective covering.

END OF SECTION 033000

SECTION 040100 - MASONRY RESTORATION AND CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Extent of masonry restoration work is indicated on drawings and as specified hereinafter.
- B. This Section includes, but is not limited to, the following masonry restoration and cleaning.
 - 1. Cleaning all exterior brick surfaces indicated to receive work on the drawings.
 - 2. 100% repointing of all brick mortar joints indicated to receive work on the drawings.
 - 3. Remove any downspouts and support hangers/brackets during cleaning and repointing.
 - 4. Remove any miscellaneous wood and metal fasteners on the masonry and repoint the holes. Verify first that these items serve no purpose.
 - 5. Replace damaged or missing brick.
 - 6. Mortar filling of all voids in brick joints to about 3/4" from surface of brick.
 - 7. Removal of plant growth and surface parging.
- C. Related Requirements:
 - 1. Section 012200 "Unit Price" for unit prices relating to work in this Section.
 - 2. Section 079200 "Joint Sealants".

1.2 DEFINITION

- A. Repointing: The process of raking out (removing) mortar and replacing it with new mortar.

1.3 QUALITY ASSURANCE

- A. Restoration Specialist: The repair and pointing shall be carried out by a firm having not less than seven (7) years successful experience under the current company name, in the cleaning, repair, joint raking and pointing of masonry similar to the work described in this Section.
 - 1. The Contractor shall submit all the following information demonstrating the masonry Contractor's qualifications and experience with the Bid for approval by the Architect and Owner. Contractors not submitting the required information or failing to meet the minimum requirements will be disqualified and will not be allowed to perform the work of this Section.
 - a. Provide written description of a minimum of three projects completed within the past five years for which the masonry Contractor has performed the masonry cleaning, pointing and repair. Projects must have been performed on properties 50 years old or older. Provide the name and address of the Project, the name and telephone number of the Owner and Architect, dates work was performed, and a description of the materials and methods used to perform the work for each project.
 - b. Submit a resume for each of the persons who will be supervising and performing the work of this Section demonstrating a minimum of three (3) years' experience working in their trades, list of three example projects describing the work the person has performed. Example projects can be the same or different than the example projects described for the said masonry Contractor described above. Only individuals whose resumes have been submitted, reviewed, and accepted will be allowed to perform the work of this Section.
 - c. The masonry Contractor's qualifications submittals shall be completed by the masonry Contractor and shall be signed by an authorized official of the firm and dated.
- B. Field-Constructed Mock-Ups: Prior to start of general masonry restoration, prepare the following sample panels on building where directed by Architect. Obtain Architect's acceptance of visual qualities before proceeding with the work. Retain acceptable panels in undisturbed condition, suitable marked, during construction as a standard for judging completed work.
 - 1. Cleaning and Paint Stripping: Demonstrate materials and methods to be used for cleaning and paint stripping of masonry surface and condition on sample panels of approximately 9 sq ft in area.
 - a. Test adjacent nonmasonry materials for possible reaction with cleaning materials.

- b. Allow waiting period of duration indicated, but not less than seven (7) calendar days, after completion of sample cleaning to permit study of sample panels for negative reactions.
 2. Repointing: Prepare a sample, areas of approximately 3' high by 3' wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints. Architect shall observe work on field sample after raking and again after first layer of pointing.
 - a. The fundamental consideration for routing and pointing procedures shall be that the materials and techniques adopted do minimal or no damage to the masonry units while achieving the desired results.
 3. Concrete Patching: Prepare one sample as selected from damaged stone of the building by the Owner's Representative for demonstrating quality of patching and workmanship expected in patching of the concrete. This sample can be incorporated to the project.
 4. Mortar Filling: Prepare sample areas of approximately 3'-0" x 3'-0" for joint grouting. All extensive voids in brick joints shall be mortared full to about 3/4" of the finish face of brick to allow repointing of these joints.
- C. Source of Material: Obtain materials for masonry restoration from a single source for each type of material required to ensure match of quality, color, pattern, and texture.
- D. Owner Representative and/or Architect may randomly selected areas of tuckpointing to be raked for verification of the appropriate depth of pointing and void filling. Contractor shall bear the cost of repointing these areas of selected destructive testing in their base bid.
- E. Masonry Preconstruction Test Service:
 1. Owner will employ separate testing laboratory to perform preconstruction testing.
 2. Preconstruction Brick Tests: Test each type of existing brick indicated for replacement and each type of proposed replacement brick, for properties indicated below, using methods of sampling and testing of ASTM C 67. Carefully remove existing bricks from locations designated by Architect.
 - a. Compressive strength.
 - b. 24-hour cold water absorption.
 - c. 5-hour boil absorption.
 - d. Saturation coefficient.
 - e. Initial rate of absorption (suction).
- F. Preconstruction Conference: Approximately two weeks prior to scheduled commencement of work of this Section, the General Contractor shall meet at Project site with Architect, Owner's Representative, masonry restoration Contractor, and each Subcontractor and other representatives directly concerned with performance of the work of this Section. General Contractor to record discussions of conference and decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
 1. Tour building exterior, inspect, identify, and discuss brick areas to be replaced. Limestone areas to be patched, limestone areas to be replaced, and discuss preparatory work to be performed by other trades.
 2. Locate mock-up sample areas and test areas.
 3. Review masonry restoration and cleaning requirements (drawings, specifications, and other Contract Documents.
 4. Review required submittals, both completed and yet to be completed.
 5. Review and finalize construction schedule related to work of this Section and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 6. Review required inspection, testing, certifying and material usage accounting procedures.
 7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements.
- B. Restoration Program: Submit written program for each phase of restoration process including protection of surrounding materials on building and site during operations. Describe in detail materials, methods, and equipment to be used for each phase of restoration work.
- C. Samples: Submit, for verification purposes, prior to mock-up erection, samples of the following:

1. For replacement face bricks provide straps or panels containing not less than 8 units and representing the entire color range.
- D. Patching Mortar: Submit the following items in time to prevent delay of the work and to allow adequate time for review and resubmittal, if needed; do not order materials or start work before receiving the written approval:
1. Written certificates from the repair mortar manufacturer shall be submitted stating that all installers of the repair mortar have successfully completed the training workshop for installation of the mortar.
 2. Samples of all specified materials and Material Safety Data Sheets (MSDS) as appropriate.
 3. Certificates, except where the material is labeled with such certification, by the producers of the materials, that all materials supplied comply with all the requirements of these specifications and the appropriate standards.
 4. Color-match patch samples fabricated on pieces of appropriate masonry from or on the building using the specified repair mortar as required.
 5. Written verification that all specified items will be used. Provide purchase orders, shipping tickets, receipts, etc., to prove that the specified materials were ordered and received.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.
- B. Deliver other materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.
- C. Protect masonry restoration materials during storage and construction from wetting by rain, snow, or ground water, and from staining or intermixture with earth or other types of materials.
- D. Protect grout, mortar, and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.6 PROJECT CONDITIONS

- A. Clean masonry surfaces only when air temperatures are 40 deg F (4 deg C) and above and will remain so until masonry has dried out, but for not less than 7 days after completion of cleaning.
- B. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 deg F (4 deg C) and 80 deg F (27 deg C) and will remain so for at least 48 hours after completion of work.
- C. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- D. Protect sills, ledges, and projections from mortar droppings.
- E. Do not apply water repellent treatments to wet surfaces or during rain or when there is a chance of rain within 24 hours after application without protection which will prevent wetting.
- F. Do not apply water repellent materials when winds are sufficient to carry airborne chemicals to unprotected surfaces.
- G. Provide protection and facilities necessary to maintain progress within schedule.

1.7 SEQUENCING AND SCHEDULING

- A. Perform masonry restoration work in the following sequence:
 1. Repair existing masonry including replacing existing masonry with new masonry materials.
 2. Rake out existing mortar from joints indicated to be repointed.
 3. Repoint existing mortar joints of masonry indicated to be restored.

4. Clean existing masonry surfaces.
5. Sealants work by others must be completed.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

- A. Face Brick and Accessories: Provide face brick and accessories, including units for lintels, arches, corners, and other special ground, cut, or sawed shapes where required to complete masonry restoration work.
 1. Provide units with color, surface texture and size to match existing brick work and with physical properties not less than those determined from preconstruction testing, of selected existing units.
 2. Intent is to use salvaged brick before providing new to match existing.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 1. For stonework and other masonry indicated, provide non staining white or gray cement complying with staining requirement of ASTM C 91 for not more than 0.03% water soluble alkali.
 - a. Intent is to match color.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: No. 1 Brick Sand (fine sand), free of loam, silt, and organic matter.
 1. Match size, texture, and gradation of existing mortar as closely as possible.
- D. Colored Mortar Pigment: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.
- E. Water: Clean, free of oils, acids, alkalis, and organic matter.

2.3 CLEANING MATERIALS AND EQUIPMENT

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- B. Warm Water: Heat water to temperature of 140 deg F 180 deg F (60 deg C 82 deg C).
- C. Brushes: Fiber bristle only.
- D. Brick Cleaner: Manufacturer's acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids including trace of phosphoric acid and combined with special wetting systems and inhibitors.
 1. Product: Subject to compliance with requirements, provide one of the following:
 - a. Sure Klean T-785 Heavy Duty Restoration Cleaner, ProSoCo, Inc.
 - b. Diedrich Chemicals.
- E. Concrete Cleaner:
 1. Product: Subject to compliance with requirements, provide Sure Klean Light Duty Concrete Cleaner by ProSoCo, Inc. or a comparable product submitted to and accepted by Architect prior to bidding.
- F. Protective Film: For windows, glass, metal, and polished stone surfaces during acidic and alkaline masonry cleaning, use self-adhesive, translucent polyethylene protective film.
 1. Products: 3M Long-mask Masking Tape #2090 and the self-adhesive, thin, window protection film by 3M, 3M Protective Tape 2A26B. Catalog No. RM2090, 24" or 35" side.
- G. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume.
 1. For spray application of chemical cleaners provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.

2. For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 45 degrees.

2.4 MORTAR MIXES

- A. Existing mortar to be analyzed by Owner's Testing Laboratory as a part of this Contract to establish existing mix, presence of portland and compressive strength. New mortar to have no more portland content than original.
- B. Measurement and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.
- C. Do not use admixtures of any kind in mortar, unless otherwise indicated.
- D. Mortar proportions:
 1. Pointing mortar for brick: One part gray portland cement, three parts lime and eight to twelve parts natural mortar aggregate.
 2. Rebuilding mortar shall be the same as pointing mortar.
 3. Intent is for cured mortar to match color, texture and not exceed compressive strength of original mortar.

2.5 CHEMICAL CLEANING SOLUTIONS

- A. General: Unless otherwise indicated, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.
- B. Acidic Cleaner Solution for Brick: Diluted with four parts water to one part cleaning solution.
- C. Chemical Paint Remover: In concentration recommended by chemical cleaner manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.
- B. Protect persons, motor vehicles, surrounding surfaces of buildings whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.
 1. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.
 2. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
 3. Dispose of run off from cleaning operations by legal means and in manner which prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
 4. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.
- C. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.
- D. Protect unpainted metal from contact with alkali chemical cleaners and water repellent by covering them either with liquid strippable masking agent or polyethylene film and waterproof masking tape.

- E. Containment of all runoff related to cleaning masonry will be a must in order to minimize impact on surrounding vegetation; Contractor is responsible to meet all local, state and federal regulations in each masonry cleaners' application, handling, and disposal. ProSoCo indicates that containment and proper disposal of Sure Klean 509 paint stripper is without exception always regulated due to the petroleum base products it contains.

3.2 CLEANING EXISTING MASONRY, GENERAL

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.
- B. Use only those cleaning methods indicated for each masonry material and location.
- C. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.
- D. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.
- E. Water Application Methods: Spray Applications: Spray water to masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume and equipment. Unless otherwise indicated, hold spray nozzle not less than 6" from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.
 - 1. Low Pressure Spray: 100 400 psi; 3 6 gallons per minute.
 - 2. Medium Pressure Spray: 400 800 psi; 3 6 gallons per minute (only upon approval of Architect).
 - 3. Steam Wash: Apply steam to masonry surfaces at pressures not exceeding 80 psi. Hold nozzle no less than 6" from surface of masonry and apply steam from side to side or in direction of tooling in overlapping bands to produce uniform coverage and an even effect.
- F. Chemical Cleaner Application Methods: Use only when directed by Architect, after performing water only cleaning methods described above.
 - 1. General: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.
 - 2. Spray Application: Apply to pressures not exceeding 50 psi, unless otherwise indicated.
 - 3. Reapplication of Chemical Cleaners: Do not apply chemical cleaners to same masonry surfaces more than twice.

3.3 CLEANING BRICKWORK

- A. Cold Water Wash: At locations indicated, clean brick masonry surface with cold water applied as follows:
 - 1. Low pressure spray.
 - 2. Medium pressure spray.
- B. Warm Water Wash: At locations indicated, clean brick masonry surfaces with warm water applied as follows:
 - 1. Low pressure spray.
 - 2. Medium pressure spray.
- C. Chemical Cleaning: At locations indicated, clean brick masonry surfaces with acidic cleaner applied as follows:
 - 1. Prewet masonry with cold water applied by low pressure spray.
 - 2. Prewet masonry with warm water applied by low pressure spray.
 - 3. Apply acidic cleaner to masonry. Let cleaner remain on surface for period indicated below before rinsing away:
 - a. As recommended by chemical cleaner manufacturer.
 - b. 2 to 3 minutes.
 - 4. Rinse masonry with cold water to remove chemicals and soil, applied by medium pressure spray.
 - 5. Repeat chemical cleaning procedure above where required to produce effect established by mock-up. Do not apply more than twice.

6. Do not clean brick work prior to seven (7) days after completion of the tuckpointing.

3.4 BRICK REMOVAL AND REBUILDING

A. Brick Removal

1. Locations of brick removal are shown on the drawings and include the following:
 - a. Bricks displaced out from original face of bricks around the windows and as shown on the drawings.
 - b. Damaged brick to be replaced as shown on the drawings and as required.
2. Carefully remove by hand at locations indicated any brick which are damaged, spalled or deteriorated. Cut out full units from joint to joint and in manner to permit replacement with full size units. Small hand power saw (3-4" diameter) with 1/8" thick diamond blade could only be used for bed joints. Cut out head joints by hand with chisel and mallet only.
3. Support and protect masonry indicated to remain which surrounds removal area.
4. Salvage as many whole, undamaged bricks as possible for re-use.
5. Remove mortar, loose particles, and soil from salvaged brick by cleaning with brushes and water. Store brick for reuse.
6. Clean remaining brick at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.
7. Repair any damaged flashing to make watertight.

B. Brick Rebuilding

1. Install new or salvaged brick to replace removed brick of infill openings as indicated on Drawings. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required use mortar driven saw designed to cut masonry with clean, sharp unchipped edges.
2. Lay replacement brick with completely filled bed, head and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure that units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.
3. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
4. Repoint new mortar joints in repaired area to comply with requirements for repointing existing masonry, except rake out joints before mortar sets.

3.5 REPOINTING EXISTING MASONRY

A. Joint Raking:

1. Rake out mortar from joints to depths equal to 2 1/2 times their widths but not less than 1" nor less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within raked out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replacement of masonry units which become damaged.
 - a. Cut out old mortar by hand with chisel and mallet, unless otherwise indicated.
 - b. For bed joints a small power operated rotary hand saw with 1/8" thick, 3" to 4" diameter diamond blade will be permitted but only on specific written approval of Architect based on submission by Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry.

B. Joint Pointing:

1. Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
2. Fill the voids with pointing mortar in layers. Compact each layer and allow it to become thumbprint hard before applying the next layer. Fill the voids to about 1" from exposed face of bricks. Fill remaining 1" depth simultaneously with final pointing of entire brick facades.

3. After joints have been filled to a uniform depth, place remaining pointing mortar in 2 layers with each of first and second layers filling approximately half of the overall depth. First layer shall have a raked square edge. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in a damp condition for not less than 72 hours. Provide temporary protection in areas exposed to direct sun.
6. Where repointing work precedes cleaning of existing masonry hallow mortar to harden not less than seven (7) days before beginning cleaning work.

3.6 FINAL CLEANING

- A. After mortar has fully hardened thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.
- B. Use of metal scrapers or brushes will not be permitted.
- C. Use of acid or alkali cleaning agents will not be permitted.
- D. Remove and dispose of waste, debris and masking materials following completion of consolidation operation. Leave surfaces and adjacent areas clean.
- E. Sweep and flush residue washed from building surface away from surrounding sidewalk and service areas nightly. Maintain premises clean and neat at all times.

END OF SECTION 040100

SECTION 042000 - UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Clay face brick (042000.A12).
 - 2. Mortar (042000.A19)
 - 3. Mortar - colored (042000.A21).
 - 4. Grout (042000.A22).
 - 5. Reinforcement
 - a. Adjustable Masonry Veneer Anchors (042000.A26).
 - 6. Masonry flashing materials:
 - a. Drip Edge (042000.A31).
 - b. Embedded flexible through-wall flashing (042000.A32).
 - c. Termination Bars (042000.A34).
 - 7. Miscellaneous masonry accessories.
 - a. Compressible filler (042000.A35).
 - b. Weep Vents (042000.A39).
 - c. Cavity drainage material (042000.A40).
 - d. Cavity wall insulation (042000.A45).
- B. Products Installed but not Furnished under This Section:
 - 1. Loose steel lintels in unit masonry.
 - 2. Steel shelf angles for supporting unit masonry.
 - 3. Cavity wall insulation.
- C. Related Requirements:
 - 1. Section 012200 "Unit Prices" for unit prices relating to work of this Section
 - 2. Section 012300 "Alternates" for alternates effecting work of this Section.
 - 3. Section 014000 "Quality Requirements" for independent testing agency procedures and administrative requirements.
 - 4. Section 024119 "Selective Demolition" for salvaged brick.
 - 5. Section 042200 "Concrete Unit Masonry" for furnishing and installing Concrete Masonry Units.
 - 6. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
 - 7. Section 055000 "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
 - 8. Section 071326 "Self Adhered Waterproofing" for additional moisture barrier product and installation requirements.
 - 9. Section 072100 "Thermal Insulation" for cavity wall insulation.
 - 10. Section 072726 "Fluid-Applied Air Barrier Coating" for air barrier and transition membrane.
 - 11. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.2 DEFINITIONS

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

1.3 PREINSTALLATION MEETINGS

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

1. Before installation of unit masonry, review procedures and tolerances for ensuring quality of masonry materials. Require representatives of each entity directly concerned with unit masonry to attend, including but not limited to the following:
 - a. Owner's representative
 - b. Architect and Engineer.
 - c. Contractor's superintendent.
 - d. Masonry subcontractor.
 - e. Manufacturer's representative for masonry units.
 - f. Manufacturer's representative for flashing components.
 - g. Manufacturer's representative for moisture barrier system.
 - h. Manufacturer's representative for fluid applied air barrier system.
2. Review field quality control measures for the following items:
 - a. Field dimensions and tolerances for unit masonry installation.
 - b. Installation procedures for flashing components.
 - c. Review of shop drawing elevations indicating colors of unit masonry and locations.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Submit product data for cavity wall insulation concurrently with product data for cavity wall insulation air barrier coatings.
- 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. Show elevations of reinforced walls.
 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
 1. Clay face brick, in the form of straps of five or more bricks.
 2. Colored mortar.
 3. Weep holes and cavity vents.
- D. Samples for Verification: For each type and color of the following:
 1. Clay face brick, in the form of straps of five or more bricks.
 2. Special shapes for the following:
 - a. Clay face brick.
 3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
 4. Adjustable veneer anchors.
 5. Flexible through wall flashing.
 6. Weep holes and cavity vents.
 7. Accessories embedded in masonry.

1.5 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect 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 exposed brick include test data for ASTM compliance.
 - c. For exposed brick, include test report for efflorescence according to ASTM C 67, including testing for Initial Rate of Absorption (IRA).
- 2. Cementitious materials. Include name of manufacturer, brand name, and type.
- 3. Mortar admixtures.
- 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
- 5. Grout mixes. Include description of type and proportions of ingredients.
- 6. Joint reinforcement.
- 7. Anchors, ties, and metal accessories.
- 8. Flexible flashing: Include independent testing to verify the 8 mil and 32 mil requirements.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
 - 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- 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. Grout Procedures: Detailed description of methods, materials, and equipment to be used to comply with grouting requirements.
- G. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythes 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 402/602-16.
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 402/602-16.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Face Brick: Obtain exposed face brick of a uniform texture, color and size, 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 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 402/602-16.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 402/602-16, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated as determined by testing according to ASTM E119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
 1. Where fire-resistance-rated construction is indicated, units shall be listed by a qualified testing agency acceptable to authorities having jurisdiction. Documentation of listing and sourcing shall be provided by manufacturer to Owner and Architect.

2.4 BRICK

- A. General: Intent is to re-use salvaged brick for all brickwork on project. In lieu of shortage of salvaged brick, 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.
- B. Face Brick (042000.A12): Facing brick complying with ASTM C 216.
1. Grade: SW.
 2. Type: FBX.
 3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength as follows:
 - a. Match existing compressive strength of existing installed adjacent brick as determined by Architect and Contractor, verified by manufacturer and Contractor's field-testing data.
 4. Initial Rate of Absorption:
 - a. Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
 - b. Match existing initial rate of absorption of existing installed adjacent brick as determined by Architect and Contractor, verified by manufacturer and Contractor's field-testing data.
 5. Saturation Coefficient: Provide units with the maximum
 - a. Match existing saturation coefficient of existing installed adjacent brick as determined by Architect and Contractor, verified by manufacturer and Contractor's field-testing data.
 6. Saturation Coefficient: Provide units with the maximum coefficient of 0.78
 7. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 8. Size (Actual Dimensions):
 - a. Match existing brick at project site as determined by Architect and Owner.
 9. Application: Use where brick is exposed unless otherwise indicated.
 10. Color and Texture: Match Architect's samples.
 - a. Match existing brick at project site as determined by Architect and Owner.
- C. Salvaged Brick:
1. General: Salvage and clean brick from deconstructed areas to provide replacement units.
 2. Salvaged Units:
 - a. Clean units removed during selective demolition areas.
 - b. Clean off residual mortar.
 3. Priorities:
 - a. Infill at openings.
 - b. Address repairs near entrances.
 - c. Address repairs below low roofs.

2.5 MORTAR (042000.A19) AND GROUT (042000.A22) 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. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
 - c. Solomon Colors, Inc.; SGS Mortar Colors.
 2. Color:
 - a. As selected by Architect from manufacturer's full range of available colors.
 3. Location: Refer to Mortar and Grout Mixes in Part 3 of this Section.
- E. 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 Corporation; 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 Cement Company; Lehigh Custom Color Portland/Lime Cement.
2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 3. Pigments shall not exceed 10 percent of portland cement by weight.
- F. 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. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C 404.
- H. 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.
- I. Water: Potable.

2.6 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie made from 0.25-inch- diameter, hot-dip galvanized steel wire, Class B-2.
- D. 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.
- E. Adjustable Masonry-Veneer Anchors (042000.A26):
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
 2. Provide anchors designed for attachment over sheathing to metal studs and other substrates indicated.
 3. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
 4. Wire Ties: Fabricate ties from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 - a. Wire ties shall be triangular- or rectangular-shaped.
 5. Masonry-Veneer Anchors - Contractor's Option: Unless otherwise indicated, provide one of the adjustable masonry-veneer anchors specified.
 - a. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie, a metal anchor section and insulation support plate. Provide one of the following anchor sections for masonry backup and metal stud with sheathing:
 - 1) Provide "CTP-16" adjustable masonry veneer anchors with insulation support plate as manufactured by Construction Tie Products, Inc.

- 2) Provide "Slotted Rap-Tie" masonry veneer anchors with insulation support plate as manufactured by FERO Corporation.
- b. Fabricate sheet metal anchors sections and other sheet metal parts from 0.075 inch thick, steel sheet, galvanized after fabrication.
6. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B 117.
7. Steel Tapping Screws for Concrete and Masonry: Self-tapping screws tapcon with specially designed threads for tapping and wedging into masonry, with hex washer head and neoprene washer, 3/16" diameter by 1-1/2" length, and with the following corrosion-protective coating:
 - a. Organic polymer coating with salt-spray resistance to red rust of more than 500 hours per ASTM B 117.

2.7 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: L-shaped steel bolts complying with ASTM A307, Grade A (ASTM 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- B. Post installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 1. Load Capacity: 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 according to ASTM E 488, conducted by a qualified independent testing agency.
 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5 unless otherwise indicated.
 3. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F738M) and nuts, ASTM F594 (ASTM F836M).
- C. Stainless Steel Dowels: ASTM A 276 or ASTM A666, Type 304, 1/2 inch diameter and not less than 5 inches long to provide at least 2 inch embedment in to adjoining units/substrates.

2.8 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing (042000.A32):
 1. Rubberized Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive.
 - a. Composite Sheet: Flashing shall be 40 mils in nominal thickness, consisting of 32 mil self-adhering rubberized asphalt membrane laminated to an 8 mil, cross-laminated and high-density polyethylene film.
 - b. Basis-of-Design Product: Subject to compliance with requirements, provide one of the products listed below or comparable product from other manufacturers, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
 - 1) Acceptable Manufacturers and Products:
 - (a) Carlisle Coatings and Waterproofing; CCW-705-TWF.
 - (b) Henry; Blueskin TWF.
 - (c) ELEVATE formerly known as Firestone Building Products; Enverge Flashgard.
 - (d) Grace Construction; Perm-A-Barrier Wall Flashing.
 - 2) Fire Propagation Characteristics: Flexible strip flashing is used in exterior walls.
 - 3) Flexible flashing shall pass NFPA 285 testing as part of an approved assembly. Flashing shall be compatible with air barrier coating specified in Section 072729.
 - c. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
- B. Application: Unless otherwise indicated, use the following:
 1. For through-wall flashing, use flexible flashing to exterior face of exterior wythe, adhere flexible flashing to top of metal drip edge. Adhere stainless steel drip edges to masonry, steel lintels and adjacent construction beneath drip edge as occurs.
- C. Accessories for Flexible Flashing:

1. Drip Edges (042000.A31): Provide stainless steel drip edges fabricated from ASTM A 240/A 240M, Type 304, not less than 0.016 inch thick. Fabricate drip edges with a 2-1/2 inch minimum flange and a 3/8 inch drip. All exposed corners shall be welded, and the edge rounded. Mitering of outside corners will not be accepted.
 - a. Termination Drip Edges at Steel Lintels and Shelf Angles: Provide stainless steel drip edges fabricated to configuration indicated from ASTM A 240/A 240M, Type 304, not less than 0.016 inch thick. Stainless steel flashing shall be performed to wrap around exposed portion of steel lintels and shelf angles and provide a drip edge.
 2. Termination Bars (042000.A34): Provide stainless steel or aluminum bars; 1/8 inch thick with a 1 inch face and 1/4 inch minimum bent top (lip) to receive sealant and 8'-0" to 10'-0" length. Bars shall be predrilled at 8 inch centers starting 4 inch from each end.
 - a. Termination bars shall be similar to Wire-Bond, Model 4210.
 3. Adhesives: Provide adhesives as recommended by flexible flashing manufacturer for adhering flexible flashing to drip edge and adhering drip edge to supporting substrate.
- D. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. Elastomeric Sealant: ASTM C 920, chemically curing urethane or polysulfide sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- F. Moisture Barrier:
1. Refer to Section 071326 "Self-Adhered Sheet Waterproofing" for additional moisture barrier system product and installation requirements.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler (042000.A35): Premolded filler strips, compressible up to 50 percent; of width and thickness indicated; formulated from neoprene or urethane.
1. Synthetic Foam complying with ASTM D 5249, Type 2; of width and thickness indicated.
 - a. Basis of Design Product: W.R. Meadows; "Cerammar".
 2. Neoprene complying with ASTM D 1056, Grade 2A1; of width and thickness indicated.
 - a. Basis of Design Product: Hohmann & Barnard, "NS Closed Cell Neoprene Sponge".
 3. Thickness:
 - a. Jams 3/8 inch.
 - b. Expansion Joints: 1/2 inch.
 4. Width:
 - a. Expansion joints above base flashing: 3 inches, held back 1 inch.
 - b. Expansion joints below base flashing: 6 inches, held back 1 inch.
 - c. Jams: 4 inches, unless otherwise indicated.
- B. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).
- C. Weep/Cavity Vent Products: Use the following unless otherwise indicated:
1. Mesh Weep/Vent (042000.A39): Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.
 - 2) CavClear/Archovations, Inc.; CavClear Weep Vents.
 - 3) Hohmann & Barnard, Inc.; Mortar Trap Weep Vents.
 - b. Size: Weep shall be sized for full vertical dimension of masonry units indicated.
- D. Cavity Drainage Material (042000.A40): Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Mortar Net USA, Ltd.; "Wall Defender".
 - b. Mortar Net Solutions; "MortarNet with Insect Barrier".

- c. Comparable products from other manufactures submitted to and accepted by Architect prior to bidding will be considered.
 - 2. Thickness: 2 inches.
 - 3. Configuration: Provide the following:
 - a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.
- E. Isolation Strip Flashing (042000.A42): Provide self-adhering, polyethylene-sheet backed rubberized asphalt membrane, 40 mils thick.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work included, but are not limited to, the following:
 - a. Air-Shield by W. R. Meadows, Inc.
 - b. Blueskin by Henry Corp.
 - c. CCW 705 by Carlisle Coatings & Waterproofing.
 - d. Hyload S/A Through Wall Flashing by Hyload, Inc.

2.10 CAVITY-WALL INSULATION (042000.A45)

- A. Polyisocyanurate Board Insulation: Refer to Section 072100 for requirements.
 - 1. Provide behind steel lintels prior to installation of through-wall flashing and at other locations where indicated. Shape to configurations shown.
- B. General: Refer to Section 072100 for miscellaneous rigid insulation installed under this Section.
 - 1. Application: Refer to details for application of rigid insulation:
 - a. Below base flashing (through wall flashing).
 - 1) Provide extruded polystyrene (XPS) insulation (072100.A01).
 - 2) Thickness: Refer to wall types on drawings.
 - b. Above base flashing (through wall flashing).
 - 1) Provide polyisocyanurate insulation (072100.A04).
 - 2) Thickness: Refer to wall types on drawings.

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned. Do not use acidic cleaners on manufactured stone masonry.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime mortar unless otherwise indicated.
 - 3. 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.
 - 1. For masonry below grade or in contact with earth, use Type S.
 - 2. For reinforced masonry, use Type S.

3. For exterior, above-grade, loadbearing and non-load-bearing walls and parapet walls, use Type S.
 4. For interior load-bearing walls, use Type S.
 5. For interior non load-bearing partitions, use Type N.
 6. For exterior masonry veneer, use Type N.
 7. For other applications where another type is not indicated, use Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products].
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Mix to match Architect's sample.
 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Clay 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 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 3000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

2.13 MATERIALS FOR CLEANING OF EXISTING MASONRY

- A. General: Cleaning methods are to be tested on field sample mockup areas and are to progress from least harsh (bucket and brush) method to more harsh (chemical cleaning) methods.
- B. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- C. Warm Water: Heat water to temperature of 140 deg F-180 deg F (60 deg C-82 deg C).
- D. Brushes: Fiber bristle only.
- E. Brick Cleaner: Manufacturer's alkaline masonry cleaner.
1. Product: Subject to compliance with requirements, provide one of the following:
 - a. Enviro Klean "ReKlaim" cleaner and Sure Klean "Limestone and Masonry Afterwash", both manufactured by ProSoCo, Inc.
 - 1) For mold and mildew removal, provide Enviro Klean "ReVive" by ProSoCo.
 - b. Diedrich Chemicals; comparable product.
- F. Protective Film: For windows, glass, metal, and polished stone surfaces during acidic and alkaline masonry cleaning, use self-adhesive, translucent polyethylene protective film.
1. Products: 3M Long-mask Masking Tape #2090 and the self-adhesive, thin, window protection film by 3M, 3M Protective Tape 2A26B. Catalog No. RM2090, 24" or 35" side.
- G. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume.
1. For spray application of chemical cleaners provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.
 2. For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 45 degrees.
- H. Chemical Cleaning Solutions:
1. When recommended by chemical cleaner manufacturer, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.

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.
 - 5. Verify that fluid applied air barrier and bellows are complete.
- 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 singlewythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Do not lay units containing with surface chips larger than a nickel.
- I. Coordination with Spray-Applied Membrane Air Barrier Coating: Adjustable veneer anchors shall be installed after application of air barrier.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.
 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
- C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
 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 bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs. Intent is to maintain existing exterior patterns.
- 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.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
 1. Fully bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Fully bed webs in mortar in grouted masonry, including starting course on footings.
 3. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
 4. 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. Exposed Joints: Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Covered Joints: Cut joints flush where indicated to receive the following finishes unless otherwise indicated.
 - 1. Finishes:
 - a. Waterproofing
 - b. Moisture Barrier.
 - c. Cavity wall insulation
 - d. Fluid applied air barriers.

3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
 - 1. Where air/moisture barrier is integral with exterior wall sheathing, use adjustable-type (two-piece-type) ties.
 - 2. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.0 sq. ft. of wall area spaced not to exceed 16 inches o.c. horizontally and 16 inches o.c. vertically. 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. Use adjustable-type (two-piece-type) ties.
 - b. At base of wall, within 12 inches of horizontal leg of through-wall flashing, provide adjustable veneer anchors. Install in joint indicated and space at 32 inches o.c.
 - c. Install additional anchors within 12 inches of openings, expansion joints, corners, and similar conditions, and at intervals, not exceeding 8 inches, around perimeter.
 - d. Provide additional anchors as needed where tie spacing is not sufficient to maintain 16 inch on center spacing each way.
 - e. Provide additional anchors one course below base flashing to hold veneer wythe below flashing during grouting. Space anchors at 24 inches on center horizontally, maximum.
 - 3. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Use adjustable-type (two-piece-type with eyelets and pintles) reinforcement to allow for differential movement regardless of whether bed joints align.
 - b. Provide additional individual adjustable anchors as needed where tie spacing is not sufficient to maintain 16 inch on center spacing each way and as follows:
 - 1) At base of wall, within 12 inches of horizontal leg of through-wall flashing, provide adjustable veneer anchors. Install in joint indicated and space at 32 inches o.c.
 - 2) Install additional anchors within 12 inches of openings, expansion joints, corners, and similar conditions, and at intervals, not exceeding 8 inches, around perimeter.
 - 3) Provide additional anchors one course below base flashing to hold veneer wythe below flashing during grouting. Space anchors at 24 inches on center horizontally, maximum.
 - 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.

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. General: Place adjustable masonry veneer anchors prior to application of spray-applied air barrier.
 - 2. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 - 3. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and backup substrate.
 - 4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings, expansion joints, corners, and similar conditions, and at intervals, not exceeding 8 inches, around perimeter.

- a. Provide additional anchors as needed where tie spacing is not sufficient to maintain 16 inch on center spacing each way.
 - b. Provide additional anchors within 12 inches above horizontal leg of through-wall flashing and lintel flashing. Space anchors at intervals of 32 inches horizontally.
 - c. Provide additional anchors one course below base flashing to hold veneer wythe below flashing during grouting. Space anchors at 24 inches on center horizontally, maximum.
- B. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
- C. Provide not less than 1-3/4 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 CAVITY-WALL INSULATION

- A. Installing Cavity Wall Insulation: Place insulation over veneer anchors and push anchors through insulation and tight against backup. 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. Rigid Insulation:
 - a. Below Base Flashing (through wall flashing):
 - 1) Install anchors over moisture barrier.
 - 2) Push rigid insulation over anchors to hold it in place prior to laying veneer.
 - b. Above Base Flashing (through wall flashing):
 - 1) Cut strip to fit size of first course gap above mortar wash.

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.

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 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 expansion joints in brick as follows (042000.A47):
 - 1. Build in compressible joint fillers where indicated.
 - a. Set compressible filler back 1 inch from face of brick to allow for sealant joint to be installed.

- b. Below base flashing, install compressible filler across cavity to prevent grout from being continuous behind the joint.
- 2. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch for installation of compressible filler and, sealant and backer rod specified in Section 079200 "Joint Sealants."
- C. Provide horizontal, pressure-relieving joints (042000.A48) by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "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.
 - 1. Hold toe of lintel back 1 inch from face of brick
- 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.
 - 1. Note: 4 inches of bearing is acceptable at brick returns.

3.13 FLASHING, WEEP HOLES, CAVITY VENTS AND CAVITY DRAINAGE

- A. General:
 - 1. Install embedded flashing, weep holes and cavity drainage material in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
 - 2. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, 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 (creating a "mortar wash" sloping towards exterior face of wall) and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - a. Where flashing is within air cavity, place through-wall flashing on sloping bed of mortar (creating a "mortar wash").
 - b. At bases of walls, where flashing abuts a vertical obstruction such as hollow metal frame, aluminum frame, etc., place through-wall flashing on sloping bed of mortar (creating a "mortar wash") to slope away from obstruction for 4 inches.
 - 2. At masonry-veneer walls, provide through wall flashing with stainless steel drip edge. Continuously adhere drip edge to veneer and then adhere through wall flashing to drip edge. Extend flashing through veneer, across airspace behind veneer and over mortar wash, turned up not less than 16 inches onto backup substrate (sheathing, concrete, etc). Overlap through wall flashing to-air barrier, lapping at least 4 inches, unless otherwise indicated. Securely fasten top of flashing to backup substrate with continuous termination bars. Anchor termination bars to backup substrate and seal top of termination bar watertight.
 - a. Where through-wall flashing abuts vertical obstructions and becomes discontinuous, turn up not less than 2 inches to form end dams and seal watertight to adjacent construction and trim flush with exterior face of masonry.
 - 3. At lintels and shelf angles, extend flashing a minimum of 8 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. Extend flashing up exterior face of backup substrate not less than 16 inches and terminate with terminations bars and sealant as previously specified. Trim flashing at end dams flush to exterior brick face.
 - 4. Drip Edges: Provide metal drip edges beneath flexible flashing (through wall flashing) at exterior face of wall at all locations where through-wall flashing extends to exterior. Extend 1/2 inch beyond exterior face of outer wythe and pre-bend to form a drip.
 - a. Adhered stainless steel drip edge to lintel and adhered to flexible through-wall flashing on top of drip edge, overlapping 1-1/2 inches, minimum. Through wall flashing shall be held back from exterior face of masonry 1/2 inch.
 - 5. Termination Drip Edging: Provide stainless steel termination drip edging over exposed exterior flanges of lintels.

6. Cores: Fill cores in masonry below flexible through-wall flashing with mortar.
 7. Cut exposed vertical edges of flexible flashing end dams off flush with face of wall after mortar is set.
 8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install counterflashing receivers and nailers for flashing and other related construction where they are shown to be built into masonry.
1. Fill cavity behind veneer with insulation as required to support mortar wash.
 2. Install receiver with back down leg tight to brick.
 3. Form mortar wash starting at back of brick and slope upward 1/2 inch at backup wall.
 4. Install windowsill receiver (pan) starting at back of window line.
- D. Install weep holes/cavity vents in exterior wythes and veneers at 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/cavity vents at 24 inches o.c. unless otherwise indicated.
 4. Space weep holes formed from wicking material 16 inches o.c.
 5. Trim wicking material flush with outside face of wall after mortar has set.
- E. Place cavity drainage material in cavities 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 24 inches on center. Use specified weep/cavity vent products to form cavity vents.

3.14 MOISTURE BARRIER

- A. Refer to Section 071326 "Self-Adhered Sheet Waterproofing" for additional moisture barrier system installation requirements.
- B. Prepare masonry surface so they are smooth and free from projections that could puncture moisture barrier.
- C. Prime CMU wall surface then install moisture barrier.
- D. Roll entire surface then seal all lap seams with mastic.
- E. Schedule work so moisture barrier is not exposed to UV more than 30 days or protect from UV.

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 TMS 402/602-16 as follows:
 1. Level "2" for all areas except High Wind Areas.
 2. Level "3" for High Wind Areas.
 3. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 4. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 5. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof. Reference the Statement of Special Inspections for additional requirements.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

- F. Mortar Aggregate Ratio Test (Proportion Specification): For site-mixed mortar, test each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

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 mockup sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Initially, clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20. Where initial cleaning results are not satisfactory as judged by Architect from testing on mockup, proceed to cleaning with proprietary cleaners.
 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.

3.18 SURFACE PREPARATION FOR FLUID APPLIED AIR BARRIERS

- A. General: This project will have fluid-applied Air Barrier material applied to the cavity side of the CMU. Special attention and care must be taken to provide a smooth, filled surface to receive the membrane. The care is necessary to insure the design performance of the selected materials. Concrete masonry unit (CMU) wall shall be prepared as follows to accept the air & vapor barrier:
 1. Surfaces shall be free of contaminants such as grease, oil and wax on surfaces to receive membrane.
 2. CMU surfaces shall be free from projections.
 3. Strike all mortar joints flush to the face of the masonry units.
 4. Fill all voids and holes greater than 1/4 inch across at any point with mortar, sealant, or other approved fill material.
 5. Surface irregularities exceeding 1/4 inch in height or sharp to touch shall be ground flush or made smooth.
 6. Fill around all penetrations with mortar, sealant or other approved fill material and strike flush.
 7. Remove mortar droppings on brick ties, shelf angles, brick shelves or other horizontal obstructions.

3.19 CLEANING OF EXISTING BRICK MASONRY

A. General Cleaning of Masonry:

1. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.
2. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.
3. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.
4. Water Application Methods: Spray Applications: Spray-apply water to masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume, and equipment. Unless otherwise indicated, hold spray nozzle not less than 6" from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.
 - a. Low Pressure Spray: 100-400 psi; 3-6 gallons per minute.
 - b. Medium Pressure Spray: 400-800 psi; 3-6 gallons per minute (only upon approval of Architect).
 - c. High Pressure Spray: Only allowed when approved by Architect and based upon field sample mockup testing results.
 - d. Steam Wash: Apply steam to masonry surfaces at pressures not exceeding 80 psi. Hold nozzle no less than 6" from surface of masonry and apply steam from side to side or in direction of tooling in overlapping bands to produce uniform coverage and an even effect.
5. Chemical Cleaner Application Methods: Use only when directed by Architect, after performing water only cleaning methods described above.
 - a. General: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.
 - b. Spray Application: Apply to pressures not exceeding 50 psi, unless higher pressure is recommended by chemical cleaner manufacturer.
 - c. Reapplication of Chemical Cleaners: Do not apply chemical cleaners to same masonry surfaces more than twice.

B. Cleaning Brickwork:

1. Cold Water Wash: At locations indicated, clean brick masonry surface with cold water applied as follows:
 - a. Low pressure spray.
 - b. Medium pressure spray.
2. Warm Water Wash: At locations indicated, clean brick masonry surfaces with warm water applied as follows:
 - a. Low pressure spray
 - b. Medium pressure spray.
3. Chemical Cleaning: At locations indicated, clean brick masonry surfaces with chemical cleaner applied as follows:
 - a. Prewet masonry with cold water applied by low pressure spray.
 - b. Prewet masonry with warm water applied by low pressure spray.
 - c. Apply chemical cleaner to masonry. Let cleaner remain on surface for period determined from preconstruction testing, scrub and thoroughly rinsing away:
 - 1) As recommended by chemical cleaner manufacturer and preconstruction testing.
 - d. Rinse masonry with chemical afterwash to remove chemicals and soil, applied by medium pressure spray.
 - e. Repeat chemical cleaning procedure above where required to produce effect established by mock-up. Do not apply more than twice.
 - f. Do not clean brick work prior to seven (7) days after completion of the tuckpointing.

END OF SECTION 042000

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout materials.
3. Reinforcement.
4. Masonry-joint reinforcement.
5. Steel lintels and steel shelf angles in accordance with Section 055000 "Metal Fabrications" in concrete unit masonry.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.
- C. Exposed: Weather-exposed side of a constructed wall.

1.3 ACTION SUBMITTALS

A. Product Data:

1. 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. Lintel design and types required.
4. Weep holes/vents.

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

1. Exposed CMUs.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

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

1. Masonry units.
 - a. Include data on material properties.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Integral water repellent used in CMUs, if not surface treated.
 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 4. Mortar admixtures.
 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 6. Grout mixes. Include description of type and proportions of ingredients.
 7. Reinforcing bars.
 8. Joint reinforcement.
 9. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- D. 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 in accordance with TMS 402/602.

1.5 QUALITY ASSURANCE

- A. Project team craftworkers of the Masonry Contractor assigned to Project will be required to have the International Masonry Institute - Grouting and Reinforcing Training or equal and to provide evidence of certificate or a letter of the firm's commitment to enroll key project personnel in the training program prior to the start of Project.
- B. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

1.6 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.

1.7 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.
- 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.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- 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 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) in accordance with Tables 1 and 2 in TMS 402/602.
 2. Determine net-area compressive strength of masonry by testing masonry prisms accordance with ASTM C1314.
- B. Regulatory Requirements: Comply with the provisions of the following codes, specifications, and standards, except as otherwise shown or specified:
 1. TMS 402/602:
 - a. Maintain one copy of the standard in Project field office at all times during construction. Contractor's supervisory personnel are to be thoroughly familiar with this material as it applies to Project.

2.3 CONCRETE UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 402/602 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 ft. vertically and horizontally of a walking surface.
- C. 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 square-edged units for outside corners unless otherwise indicated.

D. Building Lintels:

1. Concrete Lintels: Formed in Place.

2.4 CONCRETE MASONRY UNITS

A. Standard CMUs: Load-bearing ASTM C90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Density Classification: Lightweight.
3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150, 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 is not more than 0.1 percent when tested in accordance with ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Mortar Cement: ASTM C1329.

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C97. Use only pigments with a record of satisfactory performance in masonry mortar.

F. Aggregate for Mortar: ASTM C144.

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.

G. Aggregate for Grout: ASTM C404.

H. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615, 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.

C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A951.

1. Interior Walls: Mill- galvanized carbon steel.

2. Wire Size for Side Rods: 0.148-inch diameter.
3. Wire Size for Cross Rods: 0.148-inch diameter.
4. Spacing of Cross Rods: Not more than 16 inches o.c.
5. Provide in lengths of not less than 10 ft., with prefabricated corner and tee units.

2.7 TIES AND ANCHORS

- A. General: Ties and anchors extend at least 1-1/2 inches into masonry 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. Mill-Galvanized, Carbon-Steel Wire: ASTM A82, with ASTM A641, Class 1 coating.
 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82, with ASTM A153, Class B-2 coating.
 3. Galvanized-Steel Sheet: ASTM A653, Commercial Steel, G60 zinc coating.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, 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 D226, Type I (No. 15 asphalt felt).
- D. Masonry Cleaners:
 1. Proprietary Acidic Masonry Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.

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 reinforcing dowels are properly placed.
 3. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. 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.
- D. Exposed Masonry: Mix units to product uniform blend of colors and textures.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., 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 ft., 1/4 inch in 20 ft., or 1/2 inch maximum.
 - 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., 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 ft., 1/4 inch in 20 ft., or 1/2 inch maximum.
 - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., 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 ft. 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.
- C. Joints:
 - 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
 - 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 - 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
 - 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

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. 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.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. 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.
- F. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow 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.
- B. Lay solid CMUs 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. Where applicable, set masonry trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Wet joint surfaces thoroughly before applying mortar.
 - 3. Rake out mortar joints for pointing with sealant.
- D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 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. 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 corners by using prefabricated L-shaped units.

3.7 CONTROL JOINTS

- A. General: Install control joint materials in CMUs as masonry progresses. Do not allow materials to span control joints without provision to allow for in-plane wall or partition movement.
- B. Locate control joints. See Drawings.
- C. Form control joints in CMUs as follows:
 - 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.
 - 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

3.8 LINTELS

- A. Install lintels over openings as indicated.
- B. Provide concrete or formed-in-place 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. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.9 REINFORCED UNIT MASONRY

- 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 other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 402/602.
- 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 402/602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.10 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 is done at Contractor's expense.
- B. Inspections: Level B special inspections to comply with the International Building Code.
 - 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, grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
- G. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.
- I. Prism Test: For each type of construction provided, in accordance with ASTM C1314 at 7 days and at 28 days.

3.11 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as Work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid-strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 08-04A.

3.12 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. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches in each dimension.
 2. Mix masonry waste with at least 2 parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."

3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural-steel materials.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

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 anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. Structural-steel materials.
 - 2. High-strength, bolt-nut-washer assemblies.
 - 3. Threaded rods.
 - 4. Shop primer.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 - 5. Identify members not to be shop primed.
- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1 for each welded joint whether prequalified or qualified by testing, including the following:
 - 1. Power source (constant current or constant voltage).

2. Electrode manufacturer and trade name, for demand-critical welds.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural-steel materials, including chemical and physical properties.
- E. Product Test Reports: For the following:
 1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 2. Tension-control, high-strength, bolt-nut-washer assemblies.
- F. Survey of existing conditions.
- G. Source quality-control reports.
- H. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 341.
3. ANSI/AISC 360.
4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992.
- B. Channels, Angles: ASTM A36.
- C. Plate and Bar: ASTM A36.
- D. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B structural tubing.
- E. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436, Type 1, hardened carbon-steel washers; all with plain finish.

2.4 PRIMER

- A. Steel Primer:
1. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel in accordance with ASTM A6 and maintain markings until structural-steel framing has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 2.
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Galvanized surfaces unless indicated to be painted.
 - 6. Surfaces enclosed in interior construction.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
 - 1. SSPC-SP 2.
 - 2. SSPC-SP 3.
- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner.
- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- D. Splice members only where indicated.
- E. Do not use thermal cutting during erection.
- F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.5 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780.
- B. Touchup Painting:
 1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
 1. Verify structural-steel materials and inspect steel frame joint details.
 2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1.

END OF SECTION 051200

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustical roof deck.
 - 2. Composite floor deck.
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
 - 2. Section 051200 "Structural Steel Framing" for shop- and field-welded shear connectors.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Acoustical roof deck.
 - 2. Composite floor deck.
- B. Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Test and Evaluation Reports:
 - 1. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - a. Power-actuated mechanical fasteners.
 - b. Acoustical roof deck.
 - 2. Research Reports: For steel deck, from ICC-ES showing compliance with the building code.
- D. Field Quality-Control Submittals:
 - 1. Field quality-control reports.
- E. Qualification Statements: For welding personnel.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding codes:
 - 1. AWS D1.1/D1.1M.
 - 2. AWS D1.3/D1.3M.
- B. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
 - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.

2.2 ACOUSTICAL ROOF DECK

- A. Fabrication of Acoustical Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:
 - 1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 40, G60 zinc coating.
 - 2. Deck Profile: As indicated.
 - 3. Design Uncoated-Steel Thickness: As indicated.
 - 4. Span Condition: Simple span.
 - 5. Acoustical Perforations: Cellular deck units with manufacturer's standard perforated flat-bottom plate welded to ribbed deck.
 - 6. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber..
 - a. Factory install sound-absorbing insulation into cells of cellular deck.
 - 7. Acoustical Performance: NRC 0.90, tested in accordance with ASTM C423.

2.3 COMPOSITE FLOOR DECK

- A. Fabrication of Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with SDI C, with the minimum section properties indicated, and with the following:
 - 1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G60 zinc coating.

2. Profile Depth: 2 inches.
3. Span Condition: Simple span.

2.4 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions 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, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install in accordance with deck manufacturer's written instructions.

3.3 INSTALLATION OF ROOF DECK

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated.
 - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of 1-1/2-inch- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
- D. Sound-Absorbing Insulation: Installation into topside ribs of deck as specified.

3.4 INSTALLATION OF FLOOR DECK

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: 3/4 inch, nominal.
 - 2. Weld Spacing:
 - a. Weld edge ribs of panels at each support. Space additional welds an average of 16 inches apart, but not more than 18 inches apart.
 - b. Space and locate welds as indicated.
 - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of 1-1/2-inch- long welds.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.

- a. Field welds will be subject to inspection.
- 2. Steel decking will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 053100

SECTION 055000 - METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous Steel Framing and Supports (055000.A01) for:
 - a. Storefront and curtain wall.
 - b. Overhead doors.
 - c. Countertops.
 - d. Mechanical and Electrical equipment.
 - e. Bracing of partition non-load bearing CMU walls.
 - f. Steel framing and support for applications where framing and supports are not specified in other Sections.
 - 2. Shelf angles (055000.A05).
 - 3. Miscellaneous steel trim (055000.A13).
 - 4. Metal bollards (055000.A14).
 - 5. Loose bearing and leveling plates (055000.A21) for applications where they are not specified in other Sections.
 - 6. Slotted-channel inserts and ceiling assembly.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels (055000.A22).
 - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
 - 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
- C. Related Requirements:
 - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
 - 2. Section 012200 "Unit Prices" for those unit prices affecting work of this Section.
 - 3. Section 012300 "Alternates" for those alternates effecting work of this Section.
 - 4. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
 - 5. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.

1.2 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 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.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 - 2. Paint products.
 - 3. Shrinkage-resisting grout.
 - 4. Slotted channel framing.

- 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. Miscellaneous steel framing and supports.
 - a. Steel framing and supports for overhead doors.
 - b. Steel framing and supports for countertops.
 - c. Steel tube reinforcement for low partitions.
 - d. Steel framing and supports for mechanical and electrical equipment.
 - e. Bracing of partition non-load bearing CMU walls.
 - f. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 2. Shelf angles.
 - 3. Metal bollards.
 - 4. Loose steel lintels.
- C. Samples for Verification: For each type and finish of extruded nosing and tread.
- D. Delegated-Design Submittal: For items indicated under Performance Requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 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. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 SEQUENCING

- A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design the following.
 - 1. Connections to Building Structure.
 - a. Delegated design engineer shall coordinate with structural engineer to design connections to building structure.
- 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, ambient; 180 deg F, material surfaces.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

2.2 METALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. 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.
- C. Steel Channels, Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- E. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- F. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- G. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- H. Abrasive-Surface Floor Plate: Steel plate with abrasive material metallurgically bonded to steel.
- I. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- J. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- K. Zinc-Coated Steel Wire Rope: ASTM A741.
 - 1. Wire Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
- L. Stainless Steel Wire Rope: Wire rope manufactured from stainless steel wire complying with ASTM A492, Type 316.
 - 1. Wire Rope Fittings: Stainless steel connectors, Type 316, with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
- M. Steel Prestressing Strand: ASTM A416/A416M, Grade 270 (Grade 1860), low-relaxation, seven-wire, with 0.9-lb/sq. ft. (4.39-kg/sq. m) zinc coating.
 - 1. Steel Prestressing Strand Fittings: Hot-dip galvanized-steel anchors and connectors with capability to sustain, without failure, a load equal to minimum breaking strength of steel prestressing strand with which they are used.

- N. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4, and as follows:
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches.
 - 2. Material: Galvanized steel, ASTM A 653/A 653M, with G90 (Z275) coating.
- O. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- P. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- Q. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- R. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- S. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- T. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).
- U. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (lead red brass) or UNS No. C84400 (lead semired brass).
- V. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500.
- W. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent lead nickel bronze).

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 B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
 - 2. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, (ASTM A563M, Class 10S3) heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Anchors 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 according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

- I. Slotted-Channel Inserts and Ceiling Assembly: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 1-5/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.
 1. Refer to Reflected Ceiling Plans on drawings for locations using this product.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting," Section 099123 Interior Painting," and Section 099600 "High-Performance Coatings."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- H. Shrinkage-Resistant, Non-Metallic 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.

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 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.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS (055000.A01)

- 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.
 - 3. Galvanize miscellaneous framing and supports for exterior application and where indicated for interior applications.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Galvanize miscellaneous framing and supports where indicated.
- E. Prime miscellaneous framing and supports with zinc-rich primer, if not exposed to view; or primer specified in Section 099600 "High-Performance Coatings" where exposed to view or painted.

2.7 SHELF ANGLES (055000.A05)

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
 - 1. Provide mitered and welded units at corners.
 - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 MISCELLANEOUS STEEL TRIM (055000.A13)

- 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 exterior miscellaneous steel trim.
- D. Prime miscellaneous steel trim with zinc-rich primer, if not exposed to view; or primer specified in Section 099600 "High-Performance Coatings" where exposed to view or painted.

2.9 METAL BOLLARDS (055000.A14)

- A. Fabricate metal bollards from Schedule 40 steel pipe.
 - 1. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
 - 2. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.
- B. Fabricate bollards with 6 inch outside diameter and 3/8-inch-thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.
 - 1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.
- C. Fabricate sleeves for bollard anchorage from steel pipe or tubing with 1/4-inch-thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.
- D. Prime bollards with zinc rich primer.

2.10 LOOSE BEARING AND LEVELING PLATES (055000.A21)

- 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 plates.
- C. Prime plates with zinc-rich primer.

2.11 LOOSE STEEL LINTELS (055000.A22)

- 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 unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with zinc-rich primer, if not exposed to view; or primer specified in Section 099600 "High-Performance Coatings" where exposed to view or painted.

2.12 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.

2.13 FINISHES, GENERAL

- 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.

2.14 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M 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 railings 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 universal shop primer unless zinc-rich primer is indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- 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.

2.15 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 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions and overhead doors securely to, and rigidly brace from, building structure.

3.3 INSTALLING METAL BOLLARDS

- A. Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.
 - 1. Embed anchor bolts at least 4 inches in concrete.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 1. Do not fill removable bollards with concrete.
 - 2. At Contractor's Option: Provide precast concrete tops. Class "A" form finish with 5000 psi concrete reinforced with microfibers.
 - a. Basis of Design Product: Subject to compliance with requirements provide "Top Gard Pipe Bollard Cap" by TopGard Construction Products.
 - b. Size: To accommodate bollard diameter. Coordinate with Drawings.
 - c. Bolts: Provide quantity by manufacturer's written specifications according to precast top size.

3.4 INSTALLING 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 nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

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SECTION 061000 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous framing with dimension lumber (061000.A01).
 - 2. Wood blocking, cants, and nailers (061000.A13)
 - 3. Preservative-treated wood blocking, cants and nailers (061000.A12).
 - 4. Fire-Retardant-Treated Wood blocking and nailers (061000.A16).
 - 5. Wood furring and grounds (061000.A15, 061000.A18).
 - 6. Plywood blocking panels (061000.A19).
 - 7. Fire retardant treated plywood blocking and backing panels (061000.A20).
 - 8. Preservative-treated plywood blocking panels (061000.A22)
 - 9. Flexible Strip Flashing (061000.A24).
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for those alternates effecting work of this Section.
 - 2. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. SPIB: The Southern Pine Inspection Bureau.
 - 3. WCLIB: West Coast Lumber Inspection Bureau.
 - 4. WWPA: Western Wood Products Association.

1.3 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.
 - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.

2. Fire-retardant-treated wood.
3. Power-driven fasteners.

1.5 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.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products 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, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber 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. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that 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.
 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 4. Wood floor plates that are installed over concrete slabs-on-grade.

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 beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. 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.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
 - 1. Framing for raised platforms and stages.
 - 2. Plywood blocking and backing panels.
 - 3. Roof construction.

2.4 DIMENSION LUMBER FRAMING

- A. Miscellaneous Framing (061000.A01): No. 2 grade.
 - 1. Species:
 - a. Hem-fir (north); NLGA.
 - b. Mixed southern pine; SPIB.
 - c. Douglas fir-larch; WCLIB or WWPA.
 - 2. Refer to Article 2.2 and Article 2.3 for locations of preservative treated wood and fire retardant treated wood.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Preservative-treated blocking, grounds and nailers (061000.A12).
 - 2. Blocking, grounds and nailers (061000.A13).
 - a. Blocking for wall-mounted cabinets and casework shall be 2x6, minimum.
 - 3. Curbs and cants (061000.A14).
 - 4. Furring (061000.A15).
 - 5. Fire-retardant treated wood blocking and nailers (061000.A16).
 - 6. Fire-retardant treated wood curbs and cants (061000.A17).
 - a. Rooftop equipment bases and support curbs.
 - 7. Fire-retardant treated wood furring: (061000.A18).
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Mixed southern pine or southern pine; SPIB.
 2. Spruce-pine-fir; NLGA.
 3. Spruce-pine-fir (south); NeLMA, WCLIB, or WWP.
 4. Western woods; WCLIB or WWP.
- C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
 2. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWP.
 3. Western woods; WCLIB or WWP.
- 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.

2.6 MISCELLANEOUS PLYWOOD PANELS

- A. General: DOC PS 1, Exposure 1, CD, non-fire-retardant treated and fire-retardant treated as noted below, in thickness indicated or, if not indicated, not less than 5/8-inch nominal thickness.
1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 2. Plywood blocking and backing panels, non-fire-retardant treated (061000.A19).
 3. Fire-Retardant-Treated Plywood blocking and backing panels (061000.A20).
 - a. Note that plywood equipment backing panels are specified in Article below.
 4. Preservative Treated Plywood blocking and backing panels, non-fire-retardant treated (061000.A22).

2.7 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels (061000.A20): Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.
1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.8 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 2. Where rough carpentry is preservative treated or fire-retardant-treated wood materials, provide Type 304 stainless steel fasteners or fasteners with corrosion-protective coating have a salt-spray resistance of more than 800 hours according to ASTM B117.
- 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. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.

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 ASTM F 594, Alloy Group 1 or 2.

2.9 MISCELLANEOUS MATERIALS

- A. Flexible Strip Flashing (061000.A24): Provide self-adhering, membrane, 40 mils thick.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work included, but are not limited to, the following:
 - a. Air-Shield by W. R. Meadows, Inc.
 - b. Blueskin by Henry Corp.
 - c. CCW 705 by Carlisle Coatings & Waterproofing.
 - d. Hyload S/A Through Wall Flashing by Hyload, Inc.
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
 1. Adhesives shall have a VOC content of 70 g/L or less.
 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood blocking and 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.
- 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 o.c.
- F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 2. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
 3. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- 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 AWP A 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 rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. NES NER-272 for power-driven fasteners.
 2. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code.
 3. ICC-ES evaluation report for fastener.
- 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.
- L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
 2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

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 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 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood: Install 1-by-3-inch nominal-size furring vertically at 16 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

3.4 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions and for load-bearing partitions where framing members bearing on partition are located directly over studs. Fasten plates to supporting construction unless otherwise indicated.
 1. For exterior walls, provide 2-by-6-inch nominal- size wood studs spaced 16 inches o.c. unless otherwise indicated.
 2. For interior partitions and walls, provide 2-by-4-inch nominal- size wood studs spaced 16 inches o.c. unless otherwise indicated.
 3. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.
- B. Construct corners and intersections with three or more studs[, except that two studs may be used for interior non-load-bearing partitions].

- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
 - 1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
 - 2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.
- D. Provide diagonal bracing in walls, at locations indicated, at 45-degree angle, full-story height unless otherwise indicated. Use metal wall bracing, let into studs in saw kerf.

3.5 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 rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

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SECTION 061600 - SHEATHING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Type X glass-mat gypsum wall sheathing. (061600.A04).
 - 2. Composite Insulated Wall Sheathing (061600.A08).
 - 3. Subflooring (061600.A11).
 - 4. Underlayment (061600.A12).
 - 5. Miscellaneous sheathing as indicated for backup to sheet metal flashing, coping, and other applications indicated.
 - 6. Sheathing joint and penetration treatment.
- B. Related Requirements:
 - 1. Section 012200 "Unit Prices" for those unit prices affecting work of this Section.
 - 2. Section 012300 "Alternates" for those alternates affecting work of this Section.
 - 3. Section 061000 "Rough Carpentry" for plywood backing panels.
 - 4. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.
 - 5. Section 072726 "Air-Barrier Coatings" for air 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. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies 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 plywood complies with requirements. Include physical properties of treated materials.
 - 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
 - a. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
 - 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated plywood.
 - 2. Fire-retardant-treated plywood.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
 - 1. Build integrated mockups of exterior wall assembly as indicated on Drawings, incorporating backup wall construction, window, storefront, door frame and sill, ties and other penetrations, and flashing to demonstrate crack and joint treatment and sealing of gaps, terminations, and penetrations of air-barrier sheathing assembly.
 - a. Coordinate construction of mockups to permit inspection and testing of sheathing before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.

- c. If Architect determines mockups do not comply with requirements, reconstruct mockups until mockups are approved.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- B. Testing Agency Qualifications:
- 1. 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. 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 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS - GENERAL

- A. Plywood: DOC PS1.
 - 1. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
 - 2. Factory mark panels to indicate compliance with applicable standard.

2.3 WALL SHEATHING

- A. Glass-Mat Gypsum Wall Sheathing: (061600.A04)
 - 1. Products: Subject to compliance with requirements provide one of the following:
 - a. CertainTeed Corporation; GlasRoc Sheathing Type X.
 - b. G-P Gypsum Corporation; DensGlass Fireguard.
 - c. National Gypsum Company; Gold Bond eXP Fire-Shield.
 - d. United States Gypsum Co.; Securock.
 - 2. Type and Thickness: Type X, 5/8 inch thick.
 - 3. Size: 48 by 96 inches or as required for vertical installation without butt joints.

2.4 COMPOSITE NAIL BASE INSULATED WALL SHEATHING

- A. Plywood-Surfaced, Polyisocyanurate-Foam Wall Sheathing (061600.A08):
 - 1. Basis of Design Products: Subject to compliance with requirements, provide one of the following.
 - a. "Hunter Xci Ply" by Hunter Panels.
 - b. Comparable products, with the following product characteristics, shall be considered when submitted to and accepted by Architect prior to bidding.
 - 2. Product Characteristics:
 - a. Description: Plywood sheathing with foam insulation board factory adhered to one side.
 - b. Plywood Surfacing: DOC PS 2, Exposure 1, fire-retardant treated plywood.

- 1) Thickness: 3/4 inches minimum.
- c. Foam Insulation Board: ASTM C 1289, Type II, Class 1, polyisocyanurate foam insulation board.
 - 1) Thickness:
 - (a) 2 inches at precast concrete and CMU walls.
 - (b) 3 inches at cold formed metal framed walls.
- d. Adhesive: For areas where polyisocyanurate foam insulation board is attached to precast concrete or CMU walls, provide manufacturers recommended adhesive products.

2.5 SOFFIT SHEATHING

- A. Glass-Mat-Faced Gypsum Sheathing (061600.A04): ASTM C 1177/1177M.
 - 1. Type and Thickness: Type X, 5/8 inch thick.
 - 2. Size: 48 by 96 inches for vertical installation.

2.6 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Subflooring (061600.A11): Exposure 1 single-floor panels or sheathing.
 - 1. Nominal Thickness: Not less than 3/4 inch.
 - 2. Provide fire retardant treated plywood at subfloor and vertical wall conditions.
 - 3. At vertical wall conditions, provide fire retardant treated plywood with a thickness of 5/8 inches.
- B. Underlayment (061600.A12): Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch overboard or uneven subfloors.
 - 1. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exterior A-C with fully sanded face.
 - 2. Plywood Underlayment for Ceramic Tile: DOC PS 1, Exterior, C-C Plugged, not less than 5/8-inch nominal thickness.
 - 3. Plywood Underlayment for Carpet: DOC PS 1, Exposure 1, Underlayment.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof and parapet sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. For wall 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 Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. 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, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
 - 1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
 - 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.
- G. Screws for Fastening Composite Nail Base Insulated Wall Sheathing to Cold-Formed Metal Framing: Steel drill screws, in type and length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117. Provide washers or plates if recommended by sheathing manufacturer.

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.
 - 2. ICC-ES evaluation report for fastener.
- D. Coordinate 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 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall Sheathing:
 - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch apart at edges and ends.
 - 2. Subflooring:
 - a. Glue and Screw to wood framing.
 - b. Space panels 1/8 inch apart at edges and ends.
 - 3. Underlayment:
 - a. Nail to subflooring.
 - b. Space panels 1/32 inch apart at edges and ends.
 - c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

3.3 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to wood framing with screws.
 - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
 - 4. Install panels with a 1/4-inch 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.
 - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. 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.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. 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.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

END OF SECTION 061600

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SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Interior Plastic Laminated Clad Panels (064023.A08).
 - 2. Custom Plastic Laminated Clad Casework (064023.A16).
 - 3. Metal Edge Trim (064023.A24 - TR#).
 - 4. Sliding Display Case Door System (064023.A26).
 - 5. Concealed Countertop Bracket (064023.A32).
 - 6. Exposed Countertop Bracket (064023.A33).
- B. Related Sections include the following:
 - 1. Section 055000 "Metal Fabrications" for decorative metal finished components.
 - 2. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
 - 3. Section 088000 "Glazing" for glass for display case doors and shelves.
 - 4. Section 092900 "Gypsum Board" for decorative metal reveals.
 - 5. Section 101400 "Signage" for fabricated signage items.
 - 6. Section 123200 "Manufactured Wood Casework" for premanufactured casework.
 - 7. Section 123666 "Solid Surfacing Countertops" for solid surfacing countertops.

1.2 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
- B. Balanced Construction: Where exposed face of a panel is surfaced with high pressure plastic laminate and the opposite (back) surface shall receive a cabinet liner or backer sheet when that surface is not exposed to view.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, including hardware, accessories, and solid-surfacing material.
- 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.
 - 3. Show locations and sizes of cutouts and holes for items installed in architectural woodwork.
- C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.
- D. Samples for Verification:
 - 1. For each species and cut of lumber and wood trim with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 10-inch-long for trim.
 - 2. Veneer-faced panel products with transparent finish, with 1/2 of exposed surface finished, 8 by 10 inches for each species and cut of veneered panel. Include at least one face-veneer seam and finish as specified.
 - 3. Plastic laminate-faced panel products, 8 by 10 inches for each color of plastic laminate panel. Include two edges with specified edging.
 - 4. Plastic laminates, 8 by 10 inches, for each color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
 - 5. Exposed cabinet hardware and accessories, one unit for each type.
 - 6. Display case door rail finish, 4 inches long.
 - 7. Display case brackets and standards, not less than 4 inches long.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of product, signed by product manufacturer.
- B. Qualification Data: For Installer.

1.5 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 of not less than seven years under the current company name.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and plastic laminate finishes.
- D. 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.
 - 1. Comply with "Premium" grading requirements, unless specifically specified otherwise.
- E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
- F. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. 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.
- B. Stack lumber, trim, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

1.7 PROJECT CONDITIONS

- A. 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.
- B. Do not install interior architectural woodwork materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- C. 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.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. 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.

1.9 WARRANTY

- A. Special Warranty for Hardware: Manufacturer's standard from in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Failure of operating hardware.
 - b. Deterioration of finishes.
 2. Warranty period: Three years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish: Red Oak, plain sliced/plain sawn. Refer to Material Finish Legend and Drawings for addition information and locations.
- C. Wood Products: Comply with the following:
 1. Hardboard: AHA A135.4.
 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
 - a. Where Fire Retardant MDF or FRT MDF is indicated, MDF must meet class A requirements per ASTM E 84.
 3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
 4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 1. Basis of Design Products: Subject to compliance with requirements, provide "Wilsonart" or comparable product submitted to and accepted by Architect prior to bidding.
 2. Colors and Patterns: Refer to Material Finish Legend designations: **PL1, PL2**.
- E. Plastic-Laminate-Clad Panels: Particleboard or medium-density fiberboard core, ¾ inch thick, finished with plastic laminate, grade VGS in color as selected by Architect. Each panel shall be self-edged. Back panel face (non-exposed) to receive grade BKL backing sheet.
 1. Markerboard Panels (PL#) shall have markerboard edgebanding to match adjacent laminate in color and ability to erase markers. Basis of Design shall be by Rehau or a comparable manufacturer submitted to and accepted by Architect.
- F. Solid-Surfacing Material: Refer to Section 123666 Solid Surface countertops for information on solid surface products.
- G. Tempered Float Glass for Display Case Doors and Shelves: Refer to Section 088000 for requirements.

- H. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that complies with applicable requirements in Section 079200 "Joint Sealants."
- I. Curved Wood Products: Subject to compliance with requirements, provide "Kerfkore" by Kerfore or a comparable product by another manufacturer meeting the requirements for wood products as specified by the work of this section.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this Article, acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified.
 - 1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 - 3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use the following treatment type:
 - 1. Interior Type A: Low-hygroscopic formulation.
 - 2. Kiln-dry materials before and after treatment to levels required for untreated materials.

2.3 PLASTIC LAMINATE CLAD PANELS (064023.A08)

- A. General: Plastic-laminate-clad panels shall be fabricated with a particleboard or medium-density fiberboard core, 3/4 inch thick or 1/2 inch thick as indicated on Drawings, finished with plastic laminate, grade VGS in color as selected by Architect. Each panel shall be self-edged. Back panel face (non-exposed) shall receive grade BKL backing sheet.
 - 1. Fabricate to sizes and configurations indicated.

2.4 METAL EDGE TRIM (064023.A24)

- A. Millwork Cleats (064023.A24 - **TR2**): Subject to compliance with requirements, provide millwork cleat - "MWCLEAT25" by Fry Reglet Corporation or comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:-cleats for Mechanically Fastened Interior Panels:
 - 1. Material: 6063-T5 Aluminum.
 - 2. Depth: 1/4 inch.
 - 3. Height: 1-3/8 inch with 3/8 inch lift off.
 - 4. Length of Cleat: 2 inch minimum to 72 inches maximum.
 - a. Provide cleats in lengths as required to meet performance requirements.
 - 5. Installation: Mechanically fastened using manufacturer's recommended fasteners.
- B. Millwork profile (064023.A24 - **TR3**): Subject to compliance with requirements, provide millwork "U" channel - "MWU5050" by Fry Reglet Corporation or comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:
 - 1. Material: Extruded Alloy 6063-T5 Aluminum.
 - 2. Product: U-Channel
 - 3. Dimension: 1/2 inch.
 - 4. Finish: Clear anodized.
 - 5. Projection from Substrate: 1/4 inch.
 - 6. Installed with 1/2 inch millwork panels straight and uniform post horizontally or vertically between panels.
 - 7. Provide clips in lengths as required to meet performance requirements.
 - 8. Installation: Mechanically fastened using manufacturer's recommended fasteners.

- C. Millwork profile (064023.A24 - **TR4**): Subject to compliance with requirements, provide millwork base - "MWRB50400" by Fry Reglet Corporation or comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:
 - 1. Material: Extruded Alloy 6063-T5 Aluminum.
 - 2. Product: Exposed 4" base flange that provides a straight, uniform base horizontally at the bottom of millwork panels.
 - 3. Finish: Clear anodized.
 - 4. Installed with 1/2 inch millwork panels straight and uniform horizontally below panels.
 - 5. Installation: Mechanically fastened using manufacturer's recommended fasteners.
- D. Millwork profile (064023.A24 - **TR5**): Subject to compliance with requirements, provide millwork corner key - "MWCK50" by Fry Reglet Corporation or comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:
 - 1. Material: Extruded Alloy 6063-T5 Aluminum.
 - 2. Product: Corner Key
 - 3. Dimension: 1/2 inch.
 - 4. Finish: Clear anodized.
 - 5. Projection from Substrate: 1/4 inch.
 - 6. Installed with 1/2 inch millwork panels at 90 degree outside corners.
 - 7. Provide clips in lengths as required to meet performance requirements.
 - 8. Installation: Mechanically fastened using manufacturer's recommended fasteners.
- E. Millwork profile (064023.A24 - **TR6**): Subject to compliance with requirements, provide millwork post termination - "MWPT12550" by Fry Reglet Corporation or comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:
 - 1. Material: Extruded Alloy 6063-T5 Aluminum.
 - 2. Product: 1/8-inch Termination Post.
 - 3. Dimension: 1/2-inch.
 - 4. Finish: Clear anodized.
 - 5. Projection from Substrate: 1/4 inch.
 - 6. Installed with 1/2-inch millwork panels straight and uniform post horizontally or vertically at end panels.
 - 7. Provide clips in lengths as required to meet performance requirements.
 - 8. Installation: Mechanically fastened using manufacturer's recommended fasteners.
- F. Z-cleats for Mechanically Fastened Interior Panels: Subject to compliance with requirements, provide comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:
 - 1. Material: 6063-T6 Aluminum.
 - 2. Depth: 1/4 inch.
 - 3. Length of Cleat: 2 inch minimum to 72 inches maximum.
 - a. Provide cleats in lengths as required to meet performance requirements.
 - 4. Installation: Mechanically fastened using manufacturer's recommended fasteners.

2.5 CABINET HARDWARE AND ACCESSORIES

- A. 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)."
- B. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- C. Concealed Countertop Bracket (064023.A32) – Basis-of-Design Product: Subject to compliance with requirements, provide the "Concealed Flat Bracket - C-Flat 2.0" by A&M Hardware, Inc., steel thickness and dimensions shall be sized to support carrying capacity. Comparable products will be considered when submitted to and accepted by Architect prior to bidding.
 - 1. Carrying capacity shall not be less than 1000 lbs., accommodating a counter depth of at least 25 inches.
 - 2. Coordinate solid wood blocking requirements for a concealed bracket installation prior to installation of drywall.
 - 3. Include upper extension as required.
 - 4. Color: As selected from manufacturers full range.
 - 5. Sizes: As determined by countertop size.

6. Spacing: 24" on center.

- D. Exposed Countertop Bracket (064023.A33) – Basis-of-Design Product: Subject to compliance with requirements, provide A&M Hardware, Inc.; "Hybrid Bracket, HYB-1.5" without upper extension. Length of support arm varies, refer to Drawings. Color to be selected by Architect from manufacturer's full range of colors. Final color as indicated on drawings. Carrying capacity shall not be less than 450 lbs, accommodating a counter depth of at least 25 inches. Comparable products will be considered when submitted to and accepted by Architect prior to bidding.
1. Coordinate solid wood blocking requirements for a concealed bracket installation prior to Installation of drywall.
 2. Color: As selected from manufacturers full range.
 3. Sizes: As determined by countertop size.
 4. Spacing: 24" on center.
- E. Pencil Drawers: Provide Doug Mockett; Model DWR6-90 or equivalent where indicated on Drawings.

2.6 SLIDING DISPLAY CASE DOOR SYSTEM (064023.A26)

- A. Sliding Display Case Doors and Lock: Basis-of-Design; provide dual track model #P1092 with 984 NP lock as manufactured by Knape & Vogt (K & V). Key all locks for display cases alike.

2.7 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. 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.
- C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.
1. Adhesives shall have a VOC content of 70 g/L or less.
 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.8 FABRICATION, GENERAL

- A. 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.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
 2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
- C. 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.
1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

- D. 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.
- E. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.
- F. Install glass in display case doors in accordance with door manufacturer's instructions.
- G. Apply marker board laminate to flush wood doors on the non-primed face, in strict accordance with laminate manufacturer's written recommendations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine all areas and conditions where solid surfacing fabrications will be installed. Notify Architect of any conditions that would adversely affect the installation. Do not proceed with installation until unsatisfactory conditions are corrected.
 - 1. Commencement of installation is construed as acceptance of the adjacent surfaces and conditions.

3.2 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.

3.3 INSTALLATION

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. 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.
- C. 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.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.
- F. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- G. 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.
- H. Custom Casework - General: Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- I. Display Case Doors and Shelving: Install units plumb and level in strict accordance with manufacturer's written instructions. Check doors for proper operation and adjust as necessary. Install shelf hanging systems to configurations indicated and in accordance with manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. 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.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
- D. Stainless Steel Protection: Provide 6-mil plastic or other suitable water-resistant covering over the countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION 064023

SECTION 066400 - PLASTIC PANELING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic sheet paneling (066400.A01)
- B. Related Requirements:
 - 1. Section 102600 "Wall and Door Protection" for corner guards installed over plastic paneling.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

1.3 QUALITY ASSURANCE

- A. Testing Agency: Acceptable to authorities having jurisdiction.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.5 WARRANTY

- A. Furnish one-year guarantee against defects in material and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.2 PLASTIC SHEET PANELING (066400.A01)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Marlite; "Standard FRP Panels", or comparable product, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
- B. Glass-Fiber-Reinforced Plastic Paneling (066400.A01): Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319. Panels shall be USDA accepted for incidental food contact.
 - 1. Wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 - 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less (Class A).

- b. Smoke-Developed Index: 450 or less.
- 3. Nominal Thickness: Not less than 3/32 inch.
- 4. Surface Finish: Smooth texture.
- 5. Color: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
 - 1. Color: As selected by Architect from manufacturer's full range.
- B. Exposed Fasteners: Nylon drive rivets recommended by panel manufacturer.
- C. Adhesive: As recommended by plastic paneling manufacturer.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
- D. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."
 - 1. Sealant shall have a VOC content of 250 g/L or less.

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. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- B. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- C. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- D. Lay out paneling before installing. Locate panel joints so that trimmed panels at corners are not less than 12 inches wide.
 - 1. Mark plumb lines on substrate at trim accessory locations for accurate installation.
 - 2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive, supplemented with fasteners. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400

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SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes self-adhering modified bituminous sheet waterproofing system as follows:
 - 1. Perimeter insulation / protection course.
- B. Section includes self-adhering modified bituminous sheet moisture barrier (071326.A08).
- C. Related Requirements:
 - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
 - 2. Section 012200 "Unit Prices" for unit prices affecting work of this Section.
 - 3. Section 033000 "Cast-In-Place Concrete" for perimeter insulation installed with the work of this Section.
 - 4. Section 042000 "Unit Masonry" for installation of moisture barriers in unit masonry.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference for Waterproofing Sy: Conduct conference at Project site.
 - 1. Review waterproofing requirements including, but not limited to, the following:
 - a. Surface preparation specified in other Sections.
 - b. Substrate condition and pretreatment.
 - c. Minimum curing period.
 - d. Forecasted weather conditions.
 - e. Special details and sheet flashings.
 - f. Installation procedures.
 - g. Testing and inspection procedures.
 - h. Field quality control.
 - i. Protection.
 - j. Repairs.
- B. Preinstallation Conference for Moisture Barrier: Conduct conference at Project site in conjunction with unit masonry preinstallation conference.
 - 1. Review moisture barrier requirements including, but not limited to, the following:
 - a. Surface preparation specified in other Sections.
 - b. Substrate condition, pretreatment and priming.
 - c. Forecasted weather conditions.
 - d. Special details and terminations.
 - e. Installation procedures.
 - f. Protection and repairs.

1.3 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 construction details, material descriptions, and tested physical and performance properties of moisture barrier.
 - 3. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings:
 - 1. Show locations and extent of waterproofing and moisture barrier.
 - 2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

3. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining moisture barrier, membrane air barrier, and other termination conditions.
- C. Samples: For each exposed product and for each color and texture specified, including the following products:
 1. Self-adhering sheet waterproofing, 8 by 8 inches.
 2. Moisture barrier, 8 inches by 8 inches.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.
- C. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and acceptable or approved by moisture barrier manufacturer.

1.6 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 in snow, rain, fog, or mist.
- B. Environmental Limitations: Apply moisture barrier within the range of ambient and substrate temperatures recommended in writing by moisture barrier manufacturer. Do not apply to a damp or wet substrate.
 1. Do not apply moisture barrier in snow, rain, fog, or mist.
- C. Maintain adequate ventilation during preparation and application of waterproofing and moisture barrier materials.

1.7 WARRANTY

- A. Waterproofing Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which 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 Substantial Completion.
- B. Moisture Barrier Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement moisture barrier material for moisture barrier that does not comply with requirements or that fails to remain watertight within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials and molded-sheet drainage panels from single source from single manufacturer.
 1. Insulation drainage panels may be used in place of a separate molded-sheet drainage panels and perimeter insulation when approved by waterproofing system manufacturer.

- B. Source Limitations for Moisture Barrier: Obtain moisture barrier materials from single source and single manufacturer.

2.2 AUXILIARY MATERIALS

- A. General: 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 and Surface Conditioner: Liquid waterborne primers and surface conditioners 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 (071326.A02): Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 6 to 9-inch centers.
 - 1. Termination bars for moisture barrier shall be flat, without a bent edge to receive sealant.

2.3 PROTECTION COURSE

- A. Perimeter Insulation or Protection Course (071326.A03): Refer to 072100.A01 in Section 033000 "Cast-In-Place Concrete" for additional requirements regarding perimeter insulation.
 - 1. Compressive strength of not less than 8 psi according to ASTM D1621
 - 2. Maximum water absorption by volume of 0.6 percent according to ASTM C272.

2.4 MOISTURE BARRIER (071326.A08)

- A. Rubberized-Asphalt Moisture Barrier: Composite product consisting of a pliable, adhesive 32 mil rubberized-asphalt compound, bonded to a high-density, 8 mil cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
 - 1. Basis-of-Design Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - b. Grace Construction Products, W.R. Grace & Co. – Conn.; Perm-A-Barrier wall flashing.
 - 2. Application: Unless otherwise indicated, use the following:
 - a. Moisture barrier at base of wall from footing to 8 inches above horizontal leg of through wall flashing elevation.
 - 3. Primers and Mastic: Manufacturer's standard products or product recommended by moisture barrier flashing manufacturer for bonding sheets to substrates and as follows:
 - a. Solvent based primer for bonding flexible moisture barrier to substrates.
 - 1) Liquid applied with roller or brush.
 - 2) Spray adhesive recommended by manufacturer.
 - (a) Basis of Design: Carlisle Coatings and Waterproofing: Travel-Tack and Cav-Grip.
 - 4. Metal Termination Bars (071326.A02): Flat, aluminum bars, 1 tall by not less than 14 gage thick, predrilled at 6 to 9-inch centers.
 - a. Basis-of-Design Products: Subject to compliance with requirements, provide one of the following:
 - 1) Hechman Building Products; Model 1050A140.
 - 2) Hohmann and Barnard; Model T1 Term Bar.
 - 3) Wire-Bond; Model #4200 Term Bar.

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 work of this Section.
 - 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing and moisture barrier 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 D4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Refer to Section 334600 "Subdrainage" for additional coordination information with subdrainage system to provide waterproofing behind all locations indicated to receive subdrainage.
- B. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing and moisture barrier application.
- C. Mask off adjoining surfaces not receiving waterproofing and moisture barrier to prevent spillage and overspray affecting other construction.
- D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- E. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D4258.
 - 1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
- G. 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.
 - 1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
- H. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D6135.
 - 1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

3.3 INSTALLATION OF MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

- A. Prepare surfaces and install modified bituminous sheets according to waterproofing manufacturer's written instructions and recommendations in ASTM D 6135.
- B. Apply surface conditioner and 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- 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, 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.

2. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
 - a. Seal edges of sheet-waterproofing terminations with mastic.
 3. 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 beyond repaired areas in all directions.
- D. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- E. Install sheet-waterproofing and auxiliary materials to lap and seal to adjacent air barrier coating as occurs, to provide continuous building envelope barrier.
- F. Immediately install molded-sheet drainage panels and perimeter insulation with butted joints over waterproofing membrane.
1. Insulation drainage panels may be used in place of a separate molded-sheet drainage panels and perimeter insulation to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.4 INSTALLATION OF MOISTURE BARRIER

- A. General: Comply with manufacturer's recommendations for preparation of surfaces and installation of moisture barrier and as follows:
1. Prepare surfaces so they are smooth and free from projections that could puncture moisture barrier.
 2. Prime CMU wall surface then install moisture barrier.
 3. Install moisture barrier horizontally in longest lengths practical to minimize lap joints.
 4. Roll entire surface then seal all lap seams with mastic.
 5. Anchor top of moisture barrier to wall substrate with flat termination bar securely fastened to wall substrate.
 6. Schedule work so moisture barrier is not exposed to UV more than 30 days or protect from UV.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests.
- B. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.
- C. Waterproofing will be considered defective if it does not pass tests and inspections.

3.6 PROTECTION, REPAIR, AND CLEANING

- A. Protect waterproofing and moisture barrier from damage and wear during remainder of construction period.
- B. Protect installed perimeter insulation and insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- C. Correct deficiencies in or remove waterproofing and moisture barrier that does not comply with requirements; repair substrates, reapply waterproofing and moisture barrier, and repair sheet flashings.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071326

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SECTION 072100 - THERMAL INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene rigid insulation board (072100.A01)
 - a. Foundation perimeter insulation.
 - b. Cavity wall insulation below base flashing (through wall flashing).
 - 1) Refer to Section 042000 for installation requirements.
 - 2. Glass-fiber blanket (072100.A08).
 - 3. Mineral-wool blanket (072100.A17).
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for those alternates affecting work of this Section.
 - 2. Section 033000 "Cast-in-Place Concrete" for foundation insulation and foam void fill.
 - 3. Section 042000 "Unit Masonry" for foamed-in-place masonry cell foam insulation.
 - 4. Section 061600 "Sheathing" for composite nail-base insulated roof sheathing.
 - 5. Section 071326 "Self-Adhering Sheet Waterproofing" for insulating protection board/drainage panels.
 - 6. Section 074800 "Rainscreen Furring System" for insulation included in rainscreen furring system assemblies.
 - 7. Section 075423 "Thermoplastic Polyolefin (TPO) Roofing" for roof insulation.
 - 8. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.
- C. Products Furnished but not Installed Under Work of this Section:
 - 1. Cavity-wall insulation.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 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.

1.4 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.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOUNDATION PERIMETER INSULATION (072100.A01)

- A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C 578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.
- B. Extruded Polystyrene Board (072100.A01): ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
 - 1. Thermal Resistance: (180 day real-time aging as mandated by ASTM C578, measured per ASTM C 518 at mean temperature of 75F): R-5.0 per inch of thickness, with 90% lifetime limited warranty on thermal resistance.
 - 2. Edge Condition: Scored Square Edge (SSE).
 - 3. Panel Size: Provide 2 inch thick by 4 feet wide by 8 feet long, except at limited space condition provide 1.5 inch.
- C. Manufacturers and Products: Subject to compliance with requirements, provide one of the following products:
 - 1. DOW; "Styrofoam" Scoreboard insulation.
 - 2. Comparable product submitted to and accepted by Architect prior to bidding.

2.2 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced (072100.A08): ASTM C 665, Type I; 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. Thickness: As indicated on Drawings.

2.3 MINERAL-WOOL INSULATION

- A. Mineral-Wool Blanket, Unfaced (072100.A17): 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. Thickness: As indicated on Drawings.
- B. Pre-manufactured Head-of-Wall Mineral Wool Insulation: Meeting same criteria as specified above; manufactured into various shapes and sizes to fill voids between top-of-wall and metal decking.

2.4 ACCESSORIES

- A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
 - 1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - 2. Adhesives shall be compatible with fluid-applied air barrier coating specified in Section 072729.
 - 3. Adhesives shall have a VOC content of 70 g/L or less.
 - 4. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 EXECUTION

3.1 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.

3.2 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. 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.
- E. 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.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. 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.
- D. Mineral-Wool Blanket Insulation: Install at tops of non-rated interior walls to fill cavities between top of wall and underside of deck/structure above. Install in parapet walls over runner track as shown. Provide lengths that will produce a snug fit between ends.
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
- E. Spray-Applied Insulation at Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.
 - 2. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of CMU by using method recommended by insulation manufacturer.

3. Fill voids of joist bearing pockets in exterior walls.
4. Fill voids between double studs at openings in exterior walls.
5. Fill voids between framing members of boxed headers, including header.
6. Fill voids at tops of exterior walls or provide pre-manufactured head-of-wall mineral wool insulation.
7. At raised Platform between framing members for sound deadening.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

- A. Refer to Section 042000 "Unit Masonry" for additional installation requirements.

3.5 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 072100

SECTION 072500 - WEATHER BARRIERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Self-adhering weather barrier (072500.A02).
 - 2. Flexible Flashing (072500.A03).

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For self-adhering building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.
- B. Shop Drawings: For weather-barrier assemblies.
 - 1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier, from ICC-ES.
 - 1. Weather resistive barrier shall meet ICC-ES AC308 "Acceptance Criteria for Water Resistive Barriers".

1.4 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.1 WATER-RESISTIVE BARRIER (072500.A02).

- A. Basis-of-Design Products: Provide weather resistive barrier as a complete system, including but not limited to; self-adhering building wrap, self-adhering flashing, reinforced liquid flashing, tape and sealants. Subject to compliance with requirements, provide one of the following:
 - 1. VaproShield LLC; "VaproShield WrapShield SA".
 - 2. Henry Company; "BlueskinVP 160".
 - 3. Cosella-Dorken; "Delta-Vent SA".
 - 4. W.R. Meadows "Air-Shield SMP"
 - 5. Comparable substitute meeting specified requirements, and which is submitted to and accepted by Architect prior to bidding.
- B. Performance Characteristics:
 - 1. Water-Vapor Permeance: Not less than 29 perms per ASTM E 96/E 96M, Method B.
 - 2. Air Leakage: Not greater than 0.004 CFM/sqft at 1.57 lbs./sqft when tested in accordance with ASTM E2178.
 - 3. Thickness shall not be less than 0.023 inches.
 - 4. Allowable UV Exposure Time: Not less than three months.
 - 5. Fire Performance Characteristics: Class A when tested in accordance with ASTM E 84.

2.2 MISCELLANEOUS MATERIALS

- A. General: Accessory materials recommended by weather-barrier manufacturer to produce a complete assembly and compatible with primary weather-barrier material
- B. Flexible Flashing: Weather resistive barrier manufacturer's standard composite, self-adhesive, flashing product.
- C. Liquid Flashing: Weather resistive barrier manufacturer's standard composite, liquid flashing and reinforcing mesh.
- D. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.
- E. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

PART 3 EXECUTION

3.1 EXAMINATION AND SURFACE PREPARATION

- A. General: Examine and prepare surfaces to receive self-adhering building wrap/weather barrier in strict accordance with barrier manufacturer's written instructions, and as follows:
 - 1. All surfaces must be dry, sound, clean and free of oil, grease, dirt, excess mortar and other contaminants detrimental to adhesion of barrier membrane and flashings.
 - 2. Remove fins, ridges, mortar, and other projections.
 - 3. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

3.2 WATER-RESISTIVE BARRIER INSTALLATION

- A. General: Install weather-barrier and accessory materials according to manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous weather barrier.
 - 1. Apply flashing (liquid and membrane types) to comply with manufacturer's written instructions.
- B. Where recommended by weather barrier manufacturer, apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 - 1. Where indicated, cover exposed exterior surface of sheathing indicated to receive metal fascia with water-resistive barrier securely adhered to sheathing as occurs. Stagger all end lap seams.
- C. Cover sheathing with water-resistive barrier as follows:
 - 1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
 - 2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap.
 - 3. Lap over adjacent construction and adhere to substrate. Cut back weather resistive barrier so it will not be exposed to view and will allow for edge of barrier to be covered with sealant.
 - 4. Install weather barrier and auxiliary materials to lap and seal to adjacent waterproofing and air barrier coating as occurs, to provide continuity of building envelope barrier.
- D. At end of each working day, seal top edge of weather barrier to substrate with termination mastic.
- E. Openings: Prime concealed, perimeter frame surfaces of windows, storefronts, and doors. Apply transitions and flashing (liquid or membrane) so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of weather-barrier material with flexible low-rise foam sealant.

- G. Seal top of through-wall flashings to weather barrier. Provide termination bar as recommended by weather barrier manufacturer.
- H. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Repair punctures, voids, and deficient lapped seams. Slit and flatten fishmouths and blisters. Extend patches 6 inches beyond repaired areas.
- J. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.3 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.
 - 2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
 - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
 - 4. Lap water-resistive barrier over flashing at heads of openings.
 - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION 072500

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SECTION 072726 - FLUID APPLIED AIR BARRIER COATINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Vapor-retarding, fluid-applied air barriers (072726.A01).
 - 2. Transition (Detail) Membrane (072726.A03).
- B. Related Requirements:
 - 1. Section 042000 "Unit Masonry" for masonry to receive air barriers.
 - 2. Section 061600 "Sheathing" for wall sheathing to receive air barriers.
 - 3. Section 074213 "Formed Metal Wall and Soffit Panels" for testing.
 - 4. Section 076200 "Sheet Metal Flashing and Trim" for flexible membrane closures installed with air barriers.

1.2 DEFINITIONS

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

1.3 PREINSTALLATION MEETINGS

- A. Pre-Installation Conference: Conduct conference at Project site.
 - 1. Contractor to organize and convene conference a minimum of two weeks prior to commencing Work of this Section.
 - 2. Agenda shall include, at a minimum, the following:
 - a. Construction and visual inspection of mock-up.
 - b. Sequence of construction.
 - c. Coordination with substrate preparation.
 - d. Materials approved for use.
 - e. Compatibility of materials.
 - f. Coordination with installation of adjacent and covering materials.
 - g. Details of construction.
 - h. Review of inspection, testing, protection and repair procedures
 - i. Construction site safety will be discussed to review hazards or fire risks during application.
 - 3. Attendance is required by air barrier coating manufacturer's representative, air barrier coating installer, representatives of related trades including covering materials, substrate materials and adjacent materials.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; tested physical and performance properties of products.
 - 2. Include verification data, including graphic illustrations, listing each component of the assembly passing NFPA 285 testing.
 - 3. Submit product data for air barrier coatings concurrently with product data for polyisocyanurate insulation.
- B. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air barrier. Include details for each type of substrate showing: substrate joints and cracks, through-wall flashing, counterflashing, each type of penetration, inside and outside corners, terminations, expansion joints, air barrier flashing system at openings and tie-ins with adjoining construction.
2. Include details of interfaces with other materials that form part of air barrier.
3. Show and list each component of the assembly.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of manufacturer-certified installers and supervisors employed by the Installer, who work on Project, in addition to the following:
 1. Submit in writing, evidence of experience.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product test reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers, submit certified test report showing compliance with requirements specified for ASTM E2178.

1.6 QUALITY ASSURANCE

- A. Manufacturer: Air barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of waterproofing. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past five years.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer, in addition to the following:
 1. Installer shall have not less than 5 years' successful experience, under the current company name, in installing fluid-applied membrane air barriers of similar type, size and complexity as those specified for this Project.
 2. Installer shall submit a reference list, complete with Owner, Architect, General Contractor or Construction Manager; phone number of each, of at least seven (7) completed projects in the states of Missouri and Kansas similar in size and specification.
 - a. List shall include square footage installed on each project.
 - b. List shall include type of air barrier installed, name of product installed and name of manufacturer.
 3. Installer shall assign experienced mechanics from previous applications, including lead mechanic/supervisor, for this Project.
- C. Field Mockups: Build mockups to set quality standards for materials and execution.
 1. Apply air barrier coating to mockup panels specified in Section 042000 "Unit Masonry", to demonstrate surface preparation, crack and joint treatment, application of air barriers and associated flashing and transitions, and sealing of gaps, terminations, ties-ins and terminations at openings, and penetrations of air-barrier assembly.
 2. Coordinate application to mockups to permit inspection by Architect and air barrier coating manufacturer's representative of air barrier before external insulation and cladding are installed.
 - a. Include junction building corner condition, building expansion joint and sheet metal flashing.
 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.
- D. Testing Agency: Contractor shall engage an independent testing agency to perform testing as indicated in the work of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

- C. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations, and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures, and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.
- D. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
- E. Protect fluid-applied membrane components from freezing and extreme heat.
- F. Sequence deliveries to avoid delays but minimize on-site storage.

1.8 FIELD CONDITIONS

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

1.9 WARRANTY

- A. Material Warranty: Manufacturer's standard form in which manufacturer agrees to replace fluid-applied air barrier membrane materials that fail within specified warranty period when installed and used in strict conformance with written manufacturer's instructions.
 - 1. Failures for non-permeable air barrier system include, but are not limited to, the following:
 - a. Failure to maintain air permeance rating not to exceed 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference: ASTM E 2178, within specified warranty period.
 - b. Failure to maintain a vapor permeance rating no greater than 1 perms when tested in accordance with ATM E96, Method B.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS – GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
 - 1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- B. VOC Content: 100 g/L or less.
- C. Low-Emitting Materials: Products shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 PERFORMANCE REQUIREMENTS

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

- C. Exterior wall assemblies incorporating the product and accessories shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.
- D. Air barrier system shall be tested for various fastener attached penetrations including, but not limited to, veneer anchors.
- E. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
 - 1. Foundation and walls.
 - 2. Walls and windows or doors.
 - 3. Different wall systems.
 - 4. Wall and roof.
 - 5. Wall and roof over unconditioned space.
 - 6. Walls, floor and roof across construction, control and expansion joints.
 - 7. Walls, floors and roof to utility, pipe and duct penetrations.
- F. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

2.3 VAPOR-RETARDING FLUID-APPLIED AIR BARRIER

- A. Fluid-Applied, Vapor-Retarding Membrane Air Barrier (072726.A01): Fire- resistant, synthetic polymer membrane.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings and Waterproofing (CCW); "Fire-Resist BarriTech NP."
 - b. Henry Corporation; "Air-Bloc 32 MR."
 - c. W. R. Meadows; "Air-Shield LSR."
 - d. Tremco; "ExoAir 130."
 - e. Comparable products from other manufacturers meeting specified requirements, and that are submitted to and accepted by Architect prior to bidding.
 - 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
 - b. Water Vapor Permeance: Maximum 1 perm; ASTM E 96/E 96M (Method B).
 - c. Ultimate Elongation: Minimum 346 percent; ASTM D412, Die C.
 - d. Surface Burning Characteristics:
 - 1) Flame Spread Index of 25 or less; ASTM E 84.
 - 2) Smoke Generation Index of 450 or less; ASTM E 84.
 - e. Low Temperature Flexibility: No cracking at minus 20 degrees F, 180-degree bend over 1-inch mandrel.
 - f. Fastener Sealability: No water leaking through nail penetration after 24 hours; ASTM D 1970.
 - 1) System shall be coordinated and tested with installation requirements of veneer anchors and other attachments over air barrier system.
 - g. UV Exposure Rating: Coating may be exposed up to 180 days (6 months) without effecting warranty.

2.4 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete fire-resistant air-barrier assembly and compatible with primary air-barrier material.
- B. Transition Membrane and Flashing (072726.A03): Provide self-adhering sheet or reinforced liquid flashing as recommended by air-barrier material manufacturer. Approved with air barrier membrane in NFPA 285 wall assemblies.
 - 1. Basis-of-Design Products for Transition Membrane: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings and Waterproofing; "CCW Sure-Seal Pressure-Sensitive Elastoform".

- 1) SELF-ADHERING SHEET - PRODUCT INFO: Fully-adhered laminated, flexible, synthetic rubber flashing
 - (a) THICKNESS: 0.090 inch (90 mil) thickness
 - (b) WATER VAPOR PERMEANANCE: 0.06 PERM (ASTM E96 B)
- b. Henry Corporation: "Air-Bloc 16 MR".
 - 1) FLUID APPLIED VAPOR IMPERMEABLE - PRODUCT INFO:
 - (a) WATER VAPOR PERMEANANCE (ASTM E96, B): 0.03 PERM (ASTM E96 B).
 - (b) TENSILE STRENGTH (ASTM D412): 100 psi.
 - (c) ELONGATION (ASTM D412): 270%.
 - (d) PUNCTURE RESISTANCE (ASTM E154): 40 LBF.
 - (e) APPLICATION TEMP: -40 °F to +180 °F
 - (f) AIR LEAKAGE TEST PER ASTM E 283.
 - (g) MEETS NFPA 285.
- c. W. R. Meadows; "Air-Shield".
 - 1) SELF-ADHERING SHEET - PRODUCT INFO: Cross-laminated polyethylene bonded to specially modified asphalt
 - (a) THICKNESS: 40 mil thickness.
 - (b) WATER VAPOR PERMEANANCE (ASTM E96, B): 0.035 PERM (ASTM E96 B).
 - (c) TENSILE STRENGTH (ASTM D412): 4000 psi.
 - (d) ELONGATION (ASTM D412): 400 MIN.
 - (e) PUNCTURE RESISTANCE (ASTM E154): 40 LBF.
 - (f) APPLICATION TEMP: 40° F Min, LOW TEMP version available at 20° F.
 - (g) AIR LEAKAGE TEST PER ASTM E 283.
- d. Tremco; "Dymonic 100".
 - 1) FLUID APPLIED FLASHING - PRODUCT INFO: Polyurethane sealant
 - (a) ASTM C920 Type S, Grade NS, Class 50, Use NT, T, M, A, O, I
 - (b) TENSILE STRENGTH (ASTM D412): 350 to 450 psi.
 - (c) ELONGATION (ASTM D412): 800 to 900%.
 - (d) APPLICATION TEMP: 40 °F to +100 °F.
 - (e) AIR LEAKAGE TEST PER ASTM E 283. MEETS NFPA 285.
- e. Tremco; "Exoair 110 AT".
 - 1) SELF-ADHERED AIR AND VAPOR BARRIER MEMBRANE - PRODUCT INFO:
 - (a) THICKNESS: 22 mil thickness.
 - (b) ASTM C920 Type S, Grade NS, Class 50, Use NT, T, M, A, O, I
 - (c) TENSILE STRENGTH (ASTM D412): 350 to 450 psi.
 - (d) ELONGATION (ASTM D412): 800 to 900%.
 - (e) APPLICATION TEMP: 40 °F to +100 °F.
 - (f) AIR LEAKAGE TEST PER ASTM E 283. MEETS NFPA 285.
- f. Comparable products from other manufacturers listed.
- g. Comparable products from other manufacturers not listed, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
2. Basis-of-Design Products for Detail Flashing: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings and Waterproofing; "Fire-Resist 705 FR-A."
 - b. Comparable products from other manufacturers listed.
 - c. Comparable products from other manufacturers not listed, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
- C. Contact Adhesive: As approved by air-barrier manufacturer.
- D. Primer: Liquid primer as approved by air-barrier manufacturer for substrates involved.
- E. Detail Mastic: As approved by air-barrier manufacturer.
- F. Joint Reinforcing Fabric: Air-barrier manufacturer's woven, synthetic polymer reinforcement fabric.
- G. Joint Reinforcing Strip: Air-barrier manufacturer's self-adhering glass-fiber-mesh tape.
- H. Glass Mat: Randomly oriented glass strands held in binder soluble in wet air barrier membrane.
 1. As approved by air-barrier manufacturer.
- I. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

- J. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.
- K. Sprayed Polyurethane Foam Sealant: Class 1, one- or two-component, disposable, closed-cell, low-pressure spray foam insulation/sealant kits. Spray foam shall be flame retardant and have a nominal 2.0-lb/cu. ft density; 95 percent minimum closed cell content and shall meet ASTM E 84 requirements flame-spread index of 25 or less and a smoke developed rating of 300 or less based on 2-inch thickness. Provide insulation manufacturer's recommended primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- L. Joint Sealant:
 - 1. Dow 790, 791, 795.
 - 2. Pecora 890, 891, 895.
 - 3. GE Silpruf, Silpruf LM.
 - 4. Other product approved by air barrier membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
 - 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263. Honeycomb and holes/cracks exceeding ¼ inch across shall be filled with grout or mortar.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
 - 5. Verify that wall assemblies are dried in, such that water intrusion will not occur from above, behind or around the air barrier installation.
 - 6. Surfaces shall be supported and flush at joints without large voids or sharp protrusions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air barrier system.
- B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all screws with liquid flash to ensure recessed screws holes are filled. Gaps greater than 6mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the tape and fluid applied air barrier system.
- C. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.
- D. Clean, prepare, treat, and seal substrate and substrate joints according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
- E. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- F. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- G. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

- H. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- I. Fill cracks, gaps, and joints exceeding ¼ inch width with fill compound or sealant approved by air barrier manufacturer. Fill rough gaps around pipe, conduit and similar penetrations with mortar, non-shrink grout, fill compound or polyurethane foam sealant shaved flush.
- J. At changes in substrate plane, apply sealant or termination mastic beads to create a cant at sharp corners and edges to form a smooth transition from one plane to another.
- K. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
 - 1. Prime substrate and apply a single thickness of air-barrier manufacturer's recommended preparation coat extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of air-barrier coating material and embed joint reinforcing in preparation coat.
- B. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C 1193 and air-barrier manufacturer's written instructions. Apply first layer of air-barrier coating material at joints. Tape joints with joint reinforcing after first layer is dry. Apply a second layer of air-barrier coating material over joint reinforcing.
- C. Plywood Sheathing: Fill joints and apply air-barrier coating in strict accordance with air-barrier coating manufacturer's written instructions to suit substrate involved.

3.4 TRANSITION STRIP AND FLASHING INSTALLATION

- A. General: Install strips, transition strips, flashing, and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
 - 1. Coordinate the installation of air barrier with installation of sheet metal flashing and embedded masonry through-wall flashing to ensure continuity of air barrier and drainage to exterior.
 - 2. Install transition strip between changes in substrates and base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
 - 3. Vertical legs of metal flashings installed over fluid applied air barrier coatings shall receive transition strips and fluid applied flashings, installed as recommended by manufacturers written recommendations.
- B. Apply primer to substrates, when required by air barrier coating manufacturer, at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier coating material on same day. Re-prime areas exposed for more than 24 hours.
 - 1. Prime glass-fiber-surfaced gypsum and plywood sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
 - 2. Where required by air barrier coating manufacturer to achieve performance specified, apply manufacturer's recommended filler coat over CMU and similar substrates.
- C. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials. Extend flashing/transition membrane into window and other openings to completely cover wood blocking and nailers in accordance with air barrier coating manufacturer's recommendations and approved shop drawings.
- D. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- E. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

- F. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- H. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.5 INSTALLATION

- A. General: Install fluid-applied membrane air-barriers and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier/moisture barrier. Apply air-barrier coating within manufacturer's recommended application temperature ranges.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier.
 - 2. Coordinate the installation of air barrier with installation of weather barrier and jamb closure membranes to ensure compatibility and continuation of barriers to allow water to drain to exterior.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Vapor Retarding Fluid-Applied Membrane Material: Apply a continuous unbroken air-barrier membrane to substrates according to the following thickness. Apply air-barrier membrane in full contact around protrusions such as masonry ties.
 - 1. Vapor-Retarding Membrane Air Barrier: Total dry film thickness as recommended in writing by air barrier manufacturer to meet performance requirements specified and as listed in Air Barrier Association of America (ABAA) for air permeance and water vapor permeance (desiccant method), but not less than 40-mil dry film thickness.
 - a. Apply additional coats as needed to achieve void- and pinhole-free surface.
 - 2. Extend system into window and door openings of metal-stud-framed walls.
- D. Apply strip and transition strip a minimum of 1 inch onto cured air-barrier material or strip and transition strip over cured air-barrier material overlapping 3 inches onto each surface according to air-barrier manufacturer's written instructions.
- E. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- F. Repair punctures, voids, and deficient lapped seams. Slit and flatten fishmouths and blisters. Extend patches 6 inches beyond repaired areas, unless otherwise recommended by air barrier manufacturer.
- G. Do not cover air barrier until it has been inspected by air barrier coating manufacturer's representative and installation has been reviewed and accepted by Architect.
- H. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Air barrier coating manufacturer shall perform tests and inspections.
- B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include, and is not limited to, the following:
 - 1. Continuity of air-barrier system has been achieved with no gaps or holes.
 - 2. Continuous support of air-barrier system has been provided.

3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 4. Maximum exposure time of materials to UV deterioration has not been exceeded.
 5. Surfaces have been primed, if applicable.
 6. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 7. Termination mastic has been applied on cut edges.
 8. Flashing strips, transition strips and liquid flashing have been firmly adhered to substrate.
 9. Compatible materials have been used.
 10. Transitions at changes in direction and structural support at gaps have been provided.
 11. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 12. All penetrations have been sealed.
- C. Air barriers will be considered defective if they do not pass tests and inspections.
1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 2. Remove and replace deficient air-barrier components for retesting as specified above.
- D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- E. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 30 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Remove masking materials after installation.

END OF SECTION 072726

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SECTION 074216 - METAL PLATE WALL PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes metal plate wall panels.
- B. Related Sections:
 - 1. Section 054000 "Cold-Formed Metal Framing" for miscellaneous support framing.
 - 2. Section 074800 "Rainscreen Furring Systems" for pre-manufactured rainscreen furring.

1.2 DEFINITIONS

- A. Metal Plate Wall Panel Assembly: Metal plate wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weather tight wall system based on AAMA CW-RS-1.

1.3 REFERENCE STANDARDS

- A. AAMA - American Architectural Manufacturers Association (www.aamanet.org).
 - 1. AAMA CW-RS-1 – The Rain Screen Principle and Pressure Equalized Wall Design; 2004.
 - 2. AAMA 501.1 – Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure; 2005.
 - 3. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2009.
 - 4. AAMA 508 – Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems; 2007.
 - 5. AAMA 611 - Voluntary Standards for Anodized Architectural Aluminum; 1998.
 - 6. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2011 (Testing based on 2005 Edition).
 - 7. AAMA TIR-A8, "Structural Performance of Composite Thermal Barrier Framing Systems - Section 7.2"; 2004 for rain screen furring system framing components.
- B. ASTM International (American Society for Testing and Materials; www.astm.org).
 - 1. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.
 - 2. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2010.
 - 3. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2009.
 - 4. ASTM E 1233 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Air Pressure Differential; 2006.
- C. ANSI/ASHRAE 90.1-2010 for rain screen furring attachment system performance with continuous insulation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of 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 panel installation, including manufacturer's written instructions.

4. Review layout for rain screen furring system, supplemental furring and backing strips.
5. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
6. Review closures and flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
8. Review temporary protection requirements for metal panel assembly during and after installation.
9. Review procedures for repair of metal panels damaged after installation.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal plate wall 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, weep system, trim, flashings, closures, locations and types of sealants, and accessories; and special details.
 - a. Clearly differentiate between factory-assembled, shop-assembled, and field-assembled work.
 2. Accessories: Include details of the flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
 - a. Indicate flashing and trim to be provided under work of this Section and to be provided by others.
 3. Sealants: Indicate locations and types for field-installed sealants.
 4. Show layout and attachment of pre-manufactured rainscreen furring system.
 - a. Shop drawings for rainscreen furring system shall be signed and sealed by professional engineer licensed in jurisdiction where project is located.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes. Samples shall not be less than 2 by 3 inches.
 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: Not less than 8 by 8 inches square in colors selected. Include fasteners, closures, and other metal panel accessories.
 2. Trim and Closures: 6 to 8 inches in length for each trim profile. Include fasteners and other exposed accessories.
- E. Coordination Drawings: Submit exterior elevations, drawn to scale, that have the following items shown and coordinated with each other, using input from installers of these items as follows:
 1. Metal plate wall panels and attachments.
 2. Rain screen furring system and girts.
 3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
 4. Penetrations of wall by pipes and utilities.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

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

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least five years of documented experience.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer, with not less than seven (7) years of successful experience under the current company name installing metal panels similar to those required for this Project.
- C. Source Limitations: Obtain each type of metal plate wall panel from single source and from single manufacturer.
- D. Integrated Field Sample: Build field sample of wall panels to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build integrated field sample of typical wall panel area as shown on Drawings, including furring system, insulation, supports, attachments, trim, flashing, and accessories.
 - a. Field sample area shall be at least 70 sq ft. Locate as directed by Architect.
 - b. Commence installation of remaining metal wall panels only after Architect's acceptance of integrated field sample.
 - 2. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, 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. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. 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. Packaging shall be clearly labeled identifying product and manufacturer.
- B. Unload, store, and erect metal panels according to panel manufacturer's recommendations to prevent bending, warping, twisting, and surface damage.
- C. Protect panels during transportation, handling, and installation from weather, excessive temperatures, and construction operations.
- D. 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.
- E. Remove strippable protective covering on metal panels prior to installation.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of rainscreen furring system components, structural members and opening dimensions by field measurements before metal panel fabrication and indicate measurements on Shop Drawings.

1.11 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

- A. Wall System 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: One (1) year 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: In accordance with AAMA 2605 for 70 percent PVDF resin on aluminum finish requirements. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E (Hunter) units when tested according to ASTM D 2244.
 - b. Chalking, Chalky White Powder on Panel Surface: Chalking at No. 8 or less for colors or No. 6 for white in accordance with ASTM D 4214.
 - c. Loss of Adhesion: Loss of 10 percent due to cracking, checking or peeling, or failure to adhere to bare metal.
 - d. Gloss Retention: 50 percent or less in accordance with ASTM D 523.
 - e. Salt Spray, Accelerated: At least 4,000 hours in accordance with ASTM B 117.
 - f. Humidity Testing, Accelerated: At least 4,000 hours in accordance with ASTM D 2247.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General - Metal Plate Wall Panel Assemblies: Comply with performance requirements without failure due to defective manufacturing, fabrication, installation, or other construction defects.
- B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- C. Pressure Equalization Cycling: Pass cycled pressure loading from 5 psf to 25 psf for 100 three-second cycles at 0.08 seconds or less; ASTM E 1233.
- D. Air Infiltration: Air leakage of not more than 0.12 cfm/sq. ft. when tested according to ASTM E 283 in compliance with AAMA 508 criteria at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft.
- E. Water Penetration:
 - 1. Static: Pass water penetration test under static pressure when tested in accordance with ASTM E 331 at a differential of 10 percent of inward acting design load, with 15 psf pressure differences for at least 15 minutes with 5 gal per sf per hour of water applied.
 - 2. Dynamic: Pass water penetration test under dynamic pressure of 6.24 psf in accordance with AAMA 501.1.

- 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.

2.2 METAL PLATE WALL PANELS (074216.A03 - **MP1**)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Dri-Design; "Painted Aluminum Wall Panel System".
 - 1. Comparable products from other manufacturers meeting specified requirements and design criteria will be considered when submitted to and accepted by Architect prior to bidding only.
- B. General: Design, fabricate, and erect a dry joint, pressure equalized rainscreen aluminum wall panel system without use of sealants, gaskets, or butyl tape, tested as installed in compliance with AAMA 508.
- C. Metal Plate Wall Panels: Provide factory-formed, metal plate wall panels fabricated from single sheets of metal formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.
- D. Panel Depth: 1-1/4 inches, nominal.
- E. Panel Sizes: As indicated on Drawings.
- F. Panel Joints: As indicated on Drawings.
- G. Aluminum Sheet: Tension-leveled, smooth aluminum sheet, ASTM B 209 (ASTM B 209M), Not less than 0.080 inch thick minimum..
 - 1. Exterior Finish: Three-coat fluoropolymer.
 - 2. Colors: Refer to exterior elevations and Exterior Material Finish Legend for colors.
- H. Attachment Assembly: Rainscreen-principle system.

2.3 METAL PLATE SOFFIT PANELS (074216.A05)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Dri-Design; "Painted Aluminum Wall/Soffit Panel System".
 - 1. Comparable products from other manufacturers meeting specified requirements and design criteria will be considered when submitted to and accepted by Architect prior to bidding only.
- B. General: Design, fabricate, and erect a dry joint, pressure equalized rainscreen aluminum wall/soffit panel system without use of sealants, gaskets, or butyl tape, tested as installed in compliance with AAMA 508.
- C. Metal Plate Soffit Panels: Provide factory-formed, metal plate soffit panels fabricated from single sheets of metal formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.
- D. Panel Depth: 1-1/4 inches, nominal.
- E. Panel Sizes: As indicated.
- F. Panel Joints: As indicated.
- G. Aluminum Sheet: Tension-leveled, smooth aluminum sheet, ASTM B 209 (ASTM B 209M), 0.080 inch thick.
 - 1. Exterior Finish: Three-coat fluoropolymer
 - 2. Colors: Refer to exterior elevations and Exterior Material Finish Legend for colors.
- H. Attachment Assembly: Rainscreen-principle system.

2.4 MISCELLANEOUS MATERIALS

- A. Metal Plate Wall Panel Accessories: Provide components required for a complete metal plate wall panel assembly including trim, copings, fascia, mullions, sills, corner units, flashings, and similar items. Match material and finish of panels unless otherwise indicated.
- B. Provide integral drainage system and manufactures standard extrusions at termination of dissimilar materials.
- C. Flashing and Trim (074216.A07): 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, 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 panels.
 - 1. Thickness: At least 0.040 inch.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads, with at least 7/16-inch diameter head and neoprene washer. Exposed fasteners shall be kept to an absolute minimum. Exposed fasteners shall have heads matching color of metal panels by means of factory-applied coating.
 - 1. Aluminum Wall Panel Material: Stainless steel fasteners.
- E. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- F. Panel Sealants: 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. Provide sealant types that are compatible with panel materials, are nonstaining, and do not damage panel finish.

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.
 - 1. Provide aluminum wall panels with welded inside corners at backside, typically at corner locations where metal plate is bent to form reveals.
 - 2. Provide post-finishing of panels, paint aluminum wall panels only after completion of panel fabrication.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and 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 sealant and 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 in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

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 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.
- C. Comply with NAAMM's - Metal Finishes Manual for Architectural and Metal Products, for recommendations of designating finishes.
- D. Aluminum Panels and Accessories:
 - 1. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine 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 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 wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Rain Screen Furring System: Install in strict accordance with furring system manufacturer's written instructions and recommendations. Verify that girts, angles, and other wall panel support members and anchorage have been installed within alignment tolerances required by wall panel manufacturer.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
- B. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions, including pressure equalized rainscreen installation method and installation guidelines, 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. Wall panels consist of single sheets of metal formed with interlocking gutter and drainage system integral to the panel with single horizontal attachment for dry-joint rainscreen assembly.

2. Use of secondary drainage channels, brackets, support pins, joint sealants or gaskets to manage the drainage of wall panel system is not permitted.
 3. Attach wall panels using progressive interlocking method, engaging bottom of panel in top of previous panel working bottom up, and left to right.
 4. Install wall panels with single top attachment in pre-punched holes to allow individual panels to move due to thermal expansion.
 5. Do not compromise internal gutter.
 6. Install wall panels for orientation, sizes, and locations as indicated on Drawings.
 7. Install wall panels with proper anchorage and other components for this Work securely in place.
 8. Install wall panels with provisions for thermal and structural movement.
 9. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 10. Install screw fasteners in predrilled holes.
 11. Locate and space fastenings in uniform vertical and horizontal alignment.
 12. Install flashing and trim as metal panel work proceeds.
 13. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 14. 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.
 15. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Aluminum Panels: Use stainless-steel fasteners.
- 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. Attachment Assembly, General: Install attachment assembly required to support metal plate 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. Install starter extrusion at base course and at cut panel locations.
- E. Installation: Attach metal plate wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
1. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.
- F. 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 panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.
- G. 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 are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance. Install flashing and trim as wall panel Work proceeds.
 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 waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal plate wall panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing agency to perform field tests and inspections.
- B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.
- D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.
- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. 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.

3.7 PROTECTION

- A. Protect installed products from damage during subsequent construction.
- B. Replace wall panels damaged or deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074216 074216

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SECTION 074263 - COMPOSITE WALL PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior solid phenolic cladding panel system and accessories as required for a complete drained and back-ventilated rainscreen system (074263.A01 – PP1).
 - 1. Wall panels.
- B. This Section also includes:
 - 1. Pre-engineered rainscreen furring system.
- C. Related Sections:
 - 1. Section 012300 "Alternates" for alternates affecting the work of this Section.
 - 2. Section 061600 "Sheathing" for sheathing behind weather resistive barrier.
 - 3. Section 072500 "Weather Barriers" for weather resistant barrier behind composite wall panels.
 - 4. Section 074800 "Rainscreen Furring Systems" for metal panel support system.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM D 635 - Standard Test Method for Small Scale Burning.
 - 3. ASTM D 1929 - Standard Test Method for Ignition Temperature.
 - 4. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
 - 5. ASTM D 2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
 - 6. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 7. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads.
- B. European Standards (EN):
 - 1. EN 438-2 - Decorative High Pressure Laminate (HPL) Sheets Based on Thermosetting Resins - Determination of Properties.
 - 2. EN 12524 - Building Materials and Products, Hygrothermal Properties, Tabulated Design Values.
- C. International Organization for Standardization (ISO):
 - 1. ISO 105 A02-93 - Tests for Color Fastness -- Part A02: Grey scale for assessing change in color.
 - 2. ISO 178 - Determination of Flexural Properties.
 - 3. ISO 527-3 - Determination of Tensile Properties.
 - 4. ISO 846 - Evaluation of the Action of Organisms.
- D. National Fire Protection Association (NFPA):
 - 1. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
 - 2. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

- B. Shop Drawings: Submit plan, section, elevation and perspective drawings necessary to describe and convey the layout, profiles and product components, including edge conditions, panel joints, fixture location, anchorage, accessories, finish colors, patterns and textures.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Phenolic Panels: 6 to 8 inches square, including exposed fasteners.
 - 2. Mounting System, Trim and Closures: 8 to 12 inches long. Include fasteners and other exposed accessories.
- D. Code Compliance: Documents showing product compliance with local building code shall be submitted prior to the bid. These documents shall include, but not be limited to, appropriate Evaluation Reports and/or test reports supporting the use of the product. Alternate materials must be approved by the architect of record prior to the bid date.
- E. Engineering Calculations: Submit engineering calculations as required by the local building code, showing that the installed panels and attachments system meets the wind load requirements for the project.
- F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns. Please note that samples are only representative for color and pattern and not for thickness or edge finish. Metallic colors may also show a slight fluctuation in appearance do to the metal flake orientation from batch to batch.
- G. Verification Samples: For each finish product specified, two samples a minimum of 3.5 inches by 3.5 inches (89 mm by 89 mm) representing actual product, color, and patterns. Sample edges may vary from field panel edges.
- H. Operation and Maintenance Data: Submit operation, maintenance, and cleaning information for products covered under this section.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary panel products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
 - 1. Products covered under the Work listed in this section are to be manufactured in an ISO 9001 certified facility.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer trained and approved by the manufacture or representative.
- C. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- D. Mock-Up: Provide a mock-up for evaluation of the product and application workmanship.
 - 1. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
- E. Pre-installation Meetings: Conduct pre-installation conference to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Verify actual measurements/openings by field measurements performed by the installer prior to release for fabrication. Recorded measurements to be indicated on shop drawings based on field measurements provided by the installer. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Verify actual measurements/openings by field measurements performed by the installer prior to release for fabrication. Recorded measurements to be indicated on shop drawings based on field measurements provided by the installer. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.7 WARRANTY

- A. Warranty: At project closeout, provide manufacturer's limited ten year warranty covering defects in materials. Warranty only available when material installed by an installation contractor trained and approved by the manufacturer's representative.

PART 2 - PRODUCT

2.1 MANUFACTURER

- A. Basis-of-Design Manufacturer: Trespa International B.V.; P.O. Box 110, 6000 AC Weert Wetering 20, 6002 SM Weert The Netherlands; www.trespa.com.

2.2 WALL PANELS

- A. Solid Phenolic Wall Panels:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Trespa Pura NFC by Trespa International as represented by Trespa North America, LTD. Comparable products, meeting specified requirements, from other manufacturers will be considered when submitted to and accepted by Architect prior to bidding.
 - 2. Material: Solid panel manufactured using a combination of high pressure and temperature to create a flat panel created from thermosetting resins, homogenously reinforced with wood-based fibers and an integrated decorative surface or printed décor.
 - 3. Color on Primary Face:
 - a. Refer to Exterior Materials Legend on Drawings for color.
 - 4. Color on Back Face: Manufacturer's standard "decorative black."
 - 5. Finish: Matte sheen.
 - 6. Panel Core: Fire retardant (FR) core.
 - 7. Panel Thickness: 3/8 inch (10 mm).
 - 8. Physical Properties:
 - a. Modulus of Elasticity: 1,300,000 psi (9000 N/mm²) minimum, ISO 178.
 - b. Tensile Strength: 10,100 psi (70 N/mm²) minimum, ISO 527-2.
 - c. Flexural Strength: 14,500psi (120 N/mm²) minimum, ISO 178.
 - d. Thermal Conductivity: 2.1 BTU/inch/ft².hr.°F, EN 12524.
 - e. Structural Performance (ASTM E330):
 - 1) Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 15 pounds per square foot (psf). Wind load testing shall be done in accordance with this standard to obtain the following results.
 - 2) Normal to the plane of the wall, the maximum panel deflection shall not exceed L/175.
 - 3) Normal to the plane of the wall between supports, deflection of the aluminum sub-framing members shall not exceed L/175 or 3/4 inch, whichever is less.
 - (a) At 1-1/2 times design pressure, permanent deflection of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion.

- (b) If system tests are not available, mock ups shall be constructed and tests performed under the direction of an independent third party laboratory which show compliance to the minimum standards listed above Physical Properties:
- 9. Fire Performance:
 - a. Flame Spread: Class A, ASTM E 84.
 - b. Smoke Development: Less than 450, ASTM E 84.
 - c. Greater than 650 degree F (350 degree C) above ambient, ASTM D1929.
 - d. CC1 or CC2, ASTM D635.
 - e. When required for compliance with local building codes, the wall cladding assembly shall show no degradation of the rating of Fire Resistant Assemblies, ASTM E119.
 - f. When required for compliance with local building codes, the wall cladding assembly shall meet the performance requirements for Multi Story construction, NFPA 285.
 - g. When required for compliance with local building codes, the wall cladding assembly shall not ignite when exposed to a radiant heat energy source, NFPA 268.
- 10. Finish Performance: Electron Beam Cure resin in conformance with the following general requirements:
 - a. Color: As indicated.
 - b. Humidity Resistance: No formation of blisters when subjected to condensing water fog at 100% relative humidity and 100 degree F (38 degree C) for 3000 hours, ASTM D 2247.
 - c. Salt Spray Resistance: Corrosion creepage from scribe line (1/16 inch (1.6 mm) max.) and minimum blister rating of 8 within the test specimen field, ASTM B117.
 - d. Weather Exposure: Accelerated - 3000 hours in Atlas Type Weatherometer using cycle of 90 minutes light and 30 minutes diminished light and demineralized water with a maximum color change of 5 Delta E units from the original color according to ASTM D-2244, with the exception of Uni-Colors A12.3.7 / A18.3.5 / A04.1.7, which will not deviate more than 10 Delta E units from original color according ASTM D-2244.
 - e. Color Stability: The decorative surface comply with, classification, 4 - 5 measured with the grey scale according to ISO 105 A02-93 according to test method EN 438-2:29.
 - f. Microbial Characteristics: Will not support micro-organic growth (ISO 846).
- 11. Mounting System:
 - a. Pre-engineered rainscreen furring system as specified later in this Section.
 - b. TS110-285 - Exposed fastening on fixed depth aluminum furring system tested and meeting the performance requirements of NFPA 285. Location is at soffits and other locations as indicated.
 - c. Other installation systems - Include test documentation showing compliance with the performance criteria set forth in the specification and in accordance with the local building code.
 - d. Extrusions, including corner closures, joint closures and vent screens, formed members, sheet, and plate shall conform with the recommendations of the manufacturer.
- 12. Extruded Aluminum Trim: Color shall be black.
- 13. Fasteners: Fasteners shall be non-corrosive and as recommended by panel manufacturer. Exposed fasteners shall be colored to match panels where required by the Architect.
- 14. Panel Corner Profile
 - a. Square corners with eased edges.

2.3 FABRICATION

- A. Panels: Solid phenolic impregnated kraft paper wall panels with no voids, air spaces or foamed insulation in the core material. Accessory items in accordance with manufacturer's recommendations and approved submittals.
- B. Panel Weight: 10 mm (3 lb/ ft2).
- C. Panel Bow: 2 mm / m (0.079 inch/39.38 inches).
- D. Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.
- E. Appearance: Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.

2.4 RAINSCREEN FURRING SYSTEM

- A. Subframing/Furring System: Refere to Section 074800" Rainscreen Furring System."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Surfaces to receive panels shall be even, smooth, dry, and free from defects detrimental to the installation of the panel system. Notify Contractor in writing of conditions detrimental to proper and timely completion of the work.
- C. Confirm exterior sheathing is plumb and level, with no deflection greater than 1/4 inch (6 mm) in 20 feet (6096 mm).
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install solid phenolic wall panels, sub-frame and rainscreen furring system in accordance with manufacturer's instructions.
- B. Install solid phenolic wall panels plumb and level and accurately spaced in accordance with manufacturer's recommendations and approved submittals and drawings. Spaced at
- C. Anchor panels and sub-framing securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary movement and structural support.
- D. Fasten solid phenolic wall panels with fasteners approved for use with supporting substrate.
- E. Do not install panels or component parts which are observed to be defective or damaged including, but not limited to: warped, bowed, abraded, scratched, and broken members.
- F. Do not cut or trim component parts during installation in a manner that would damage the finish, decrease the strength, or result in visual imperfection or a failure in performance. Return component parts with require alteration to the shop for re-fabrication or replacement.
- G. Install corner profiles and trim with fasteners appropriate for use with adjoining construction as indicated on the Contract Drawings and as recommended by manufacturer.

3.4 ADJUSTING AND CLEANING

- A. Remove masking or panel protection as soon as possible after installation. Any masking intentionally left in place after panel installation on an elevation, shall become the responsibility of the General Contractor to remove.
- B. Adjust final panel installation so that all joints are true and even throughout the installation. Panels out of plane shall be adjusted with the surrounding panels to minimize any imperfection.
- C. Repair panels with minor damage. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement shall become the responsibility of the General Contractor.

- D. Clean finished surfaces as recommended by panel manufacturer. After installation cleaning, cleaning during construction shall become the responsibility of the General Contractor.

END OF SECTION 074263

SECTION 074400 - CONCRETE FACED RIGID INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concrete faced insulated perimeter wall panels (074400.A01).
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for foundation insulation and foam void fill.
 - 2. Section 042000 "Unit Masonry" for foamed-in-place masonry cell foam insulation.
 - 3. Section 071416 "Cold Fluid-Applied Waterproofing" for insulating protection board/drainage panels.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.3 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.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provides design, engineering, fabrications and testing of all required components and assemblies for a complete system.
- B. Mock-Up/Field Sample: Provide a mock-up/field sample for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship is approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.
 - 4. Subject to compliance with requirements, mock-up/field samples may remain as a part of the completed work, if acceptable to Architect and Owner.

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.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.

2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.
 4. Store panels laying flat
 5. Do not drop panels.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 PRODUCTS

2.1 CONCRETE FACED INSULATED PERIMETER WALL PANELS (074400.A01)

- A. Basis of Design Product: Subject to compliance with requirements, provide "WallGUARD Concrete Faced Insulated Perimeter Panels" by T-Clear / FinPan or a comparable product, the following product characteristics, submitted to and accepted by Architect prior to bidding.
1. Construction: Perimeter Foundation Insulation: Extruded polystyrene board to ASTM C 578 (CAN/ULC-S701) Type IV, rigid, closed cell, with integral high-density skin, c/w integral 5/16 inch (8 mm) thick latex-modified concrete facing.
 - a. Board Size: 2 feet by 4 feet by 3-5/16 inches thick.
 - b. Edges: Tongue and groove sides, square edge ends.
 - c. Maximum Use Temperature: 165-degree F.
 - d. Thermal Resistance (ASTM C 518): Long term aged R-value of 5 per inch.
 - e. Foam Compressive Strength, ASTM D 1621, minimum: 35 psi.
 - f. Compressive Strength: to ASTM D 1621, minimum 40 psi.
 - g. Water Absorption (ASTM D 2842): < 0.1 (0.7% by volume maximum).
 - h. Water Vapor Permeance (ASTM E 96): 0.8 perms.
 - i. Coefficient of Lineal Thermal Expansion (ASTM D 696, in/in x degree F (mm/m x degree C)): 3.5 x 10⁻⁵ (6.3 x 10⁻²).
 2. Accessories:
 - a. Metal Cap Flashing: 24 ga (0.61mm) galvanized steel J-channel; 2-1/4 inches wide, 4 inches long leg and 2-1/4 inches short leg; prefinished in color as selected.
 - b. Side Flashing: UV stable rigid PVCJ-channel; 2-1/2 inches wide, 4 inches long leg and 2-1/4 inches short leg; prefinished gray.
 - c. Clips and Fasteners: corrosion-resistant type, sized to suit application as supplied by insulation manufacturer.
 3. Wall Panel System Fire Test:
 - a. Meets Uniform Building Code (UBC) 17-5 - Room Fire Test Standard for Interior of Foam Plastic Systems. Criteria are to maintain coverage of foam substrate up to 8 feet (2438 mm) from interior corner, over the duration of the test.
 - b. Equivalent to current UL 17-15 and UBC 97 revised.

2.2 ACCESSORIES

- A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 2. Adhesives shall be compatible with fluid-applied air barrier coating specified in Section 072726.
 3. Adhesives shall have a VOC content of 70 g/L or less.

4. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 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.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

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.

3.4 INSTALLATION OF CONCRETE FACED INSULATED PERIMETER WALL PANELS

- A. Perimeter Insulation Substrate Examination (Poured Concrete or Concrete Block Only):
 1. Verify that the insulation boards and adjacent materials are compatible.
 2. Verify that the substrate is flat, sound, clean and remove any masonry irregularities or jagged surfaces on the foundation wall.
- B. Perimeter Insulation Installation:
 1. Layout concrete-faced insulation boards to maximize board sizes. Do not use boards less than 6 inches wide.
 2. Install concrete-faced insulation board system in orientation as indicated or to maximize full sheets. Complete with fastening clips and cap flashing in accordance with manufacturer's installation guidelines.

3.5 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.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 074400

SECTION 074800 - RAINSCREEN FURRING SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes providing continuous insulation and composite framing support (rainscreen furring) system integrated with exterior wall cladding.
- B. Related Sections:
 - 1. Section 072726 "Fluid Applied Air Barrier Coatings" for performance testing.
 - 2. Section 074213 "Formed Metal Wall and Soffit Panels" for exterior wall cladding over rainscreen furring.
 - 3. Section 074216 "Metal Plate Wall Panels" for exterior wall cladding over rainscreen furring.

1.2 REFERENCE STANDARDS

- A. ASTM International (American Society for Testing and Materials; www.astm.org).
 - 1. ASTM A 653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process; 2015.
 - 2. ASTM C 518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus; 2015.
 - 3. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
 - 4. ASTM C 1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2015.
 - 5. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
 - 6. ASTM E 96/E96M – Standard Test Methods for Water Vapor Transmission of Materials; 2015.
- B. ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers; ashrae.org).
 - 1. ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013. For rain screen furring attachment system performance with continuous insulation.
- C. NFPA – National Fire Protection Association (www.nfpa.org)
 - 1. NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects rainscreen furring.
 - 2. Coordinate installation of rainscreen furring system over substrate indicated for proper drainage, flashing, trim, back-up support framing, soffits and other related work.
 - 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 methods and procedures related to rainscreen furring installation, including manufacturer's written instructions.
 - 5. Review layout for rain screen furring system, supplemental furring and backing strips.
 - 6. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 7. Review closures and flashings, special wall cladding details, wall penetrations, openings, and condition of other construction that affect rainscreen furring.
 - 8. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
 - 9. Review temporary protection requirements for rainscreen furring assembly during and after installation.
 - 10. Review procedures for repair of rainscreen furring damaged after installation.

11. 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 rainscreen furring system and accessory.
- B. Shop Drawings: For each type of rainscreen furring system specified, submit the following:
 1. Show layout and attachment of rainscreen furring.
 - a. Include details of edge conditions, corners, anchorages, attachment system, weep system, trim, flashings, closures, locations and types accessories, and special details.
 2. Shop drawings for rainscreen furring system shall be signed and sealed by professional engineer licensed in jurisdiction where project is located.
 - a. Include comprehensive structural design analysis and calculations.
- C. Samples: For each type of rainscreen furring system component indicated. Samples shall not be less than 8 inches in length.
 1. Include similar Samples of each type of trim, shims and accessories.
- D. Coordination Drawings: Submit exterior elevations, drawn to scale, that have the following items shown and coordinated with each other, using input from installers of these items as follows:
 1. Rain screen furring system and continuous insulation.
 2. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
 3. Penetrations of wall by pipes and utilities.
 4. Submit connection details to cladding manufacturers, showing interface of rainscreen furring to substrate and each type of exterior wall cladding. Coordinate layouts and details with adjacent construction.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Manufacturer and Installer.
- B. Product Test Reports: For each product, tests performed by a qualified testing agency.
- C. Test and Inspection Reports: Submit test and inspection reports on each type of wall cladding system based on evaluation of comprehensive tests performed by nationally recognized testing agency.
- D. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing rainscreen furring systems similar to that specified in this section and with at least three years of documented experience.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer, with not less than three years of successful and documented experience under the current company name installing rainscreen furring similar to those systems required for this Project.
 1. Installer shall have completed at least seven (7) projects of equivalent scope.
- C. Source Limitations: Obtain each type of rainscreen furring system and continuous insulation from single source and from single manufacturer.
- D. Integrated Field Sample: Build field sample of rainscreen furring system coordinated with exterior cladding types to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 1. Refer to exterior cladding sections:
 - a. Section 074213 "Formed Metal Wall and Soffit Panels."
 - b. Section 074216 "Metal Plate Wall Panels."

2. Build integrated field sample of typical wall panel area as shown on Drawings.
 - a. Field sample area shall be at least 70 sq ft. Locate as directed by Architect.
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.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and components in manufacturer's original, unopened and undamaged containers or bundles. Containers and/or bundles shall be clearly labeled identifying product and manufacturer. Exercise care to avoid damage during unloading, storing and installation.
- B. Store, protect and handle materials and components in accordance with manufacturer's recommendations to prevent damage, contamination, and deterioration. Keep materials and components clean, dry, and free of dirt and other foreign matter, and protect from damage to weather and construction activities.
 1. Handle components in a manner to prevent bending, warping, twisting, and surface, edge and corner damage.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of rainscreen furring to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of rainscreen furring system components, structural members, and opening dimensions by field measurements before metal panel fabrication, indicate measurements on Shop Drawings.
 1. Where field measurements cannot be made without delaying work, guarantee dimensions and proceed with fabrication of rainscreen furring corresponding to established dimensions.

1.9 COORDINATION

- A. Coordinate work of this section with exterior cladding, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
- B. Coordinate construction to ensure that assemblies fit properly to supporting and adjoining construction; coordinate schedule with construction in progress to avoid delaying the Work.

1.10 WARRANTY

- A. Continuous Insulation and Rainscreen Furring System Warranty: Manufacturer's standard limited warranty 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. Components of the rainscreen furring system, including failure of components when all materials and components are supplied and installed according to furring manufacturer's requirements.
 2. Includes labor and material for removal and replacement of defective material and components.
 3. Includes labor to remove and reinstall exterior cladding, finish closures, flashing and cladding accessories necessary to access defective material.
 4. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Rainscreen furring system shall be capable of withstanding effects of loads and stresses from dead loads, wind loads, ice loads (as applicable) as set forth in the Structural General Notes and normal thermal movement without evidence of permanent defects of assemblies and components.
- B. System Thermal Design: Ensure installed continuous insulation and rainscreen furring system, sub-framing, clips and cladding attachment does not have thermal bridging of fasteners or framing that creates a continuous metal path from exterior surface of insulation to interior face of insulation.
 - 1. System thermal design shall meet or exceed thermal design requirements in compliance with ANSI/ASHRAE 90.1-2010.
 - 2. Thermal Resistance of Wall Assembly: Not less than an R-Value of 18.4.
- C. Temperature: Comply with structural loading requirements within temperature range of minus 55 degrees F to 180 degrees F.
- D. Fire Test Response Characteristics: Provide rainscreen furring system with fire test results indicated as determined by test standard indicated and applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Surface Burning Characteristics: in compliance with ASTM E 84, for foam insulation, fiber reinforced polymer (FRP) and interior surface as follows:
 - a. Flame Spread Index: 25 or less.
 - b. Smoke Developed Index: 450 or less.
 - 2. Intermediate Scale Multistory Test: Comply with NFPA 285 and/or International Building Code (IBC) acceptance criteria for wall height above grade and fire separation distances.
- E. 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.

2.2 CONTINUOUS INSULATION AND PREMANUFACTURED RAINSCREEN FURRING SYSTEM (074800.A01)

- A. General: Manufacturer of rainscreen furring system shall be responsible for engineering and design of the furring system, including anchorage to the structural system and necessary modifications to meet specified requirements and to maintain visual design concepts.
 - 1. Manufacturer shall employ a registered professional engineer, licensed to practice engineering in jurisdiction where the project is located, to engineer each component of rainscreen furring system.
- B. Manufacturer and Product for Continuous Insulation and Subframing/Rainscreen Furring System:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide continuous insulation and rainscreen furring system "SMARTci 2-in-1 System" as manufactured by Advanced Architectural Products (A2P). Include all necessary inside and outside corner components and accessories for complete system to properly support exterior wall cladding.
 - a. Comparable products from other manufacturers, meeting specified requirements, will be considered when submitted to and accepted by Architect prior to bidding.
- C. General – System Description for Rainscreen Furring System:
 - 1. Rainscreen system components shall be anchored through exterior sheathing to metal stud framing. Continuous insulation and rainscreen furring system shall be installed with shims as indicated on approved shop drawings and in compliance with specified requirements.

- D. Rainscreen Furring System: Provide rainscreen furring system consisting of polyester and vinyl ester bioresin matrix (FRP) with recycled materials, fire retardant additives and integral continuous metal inserts the length of the profile. Reinforce rainscreen furring system with glass rovings used internally for longitudinal (lengthwise) strength and continuous strand glass mats or stitched reinforcements used internally for traverse (crosswise) strength.
1. Depth of Furring members: As indicated on the drawings.
 2. Spacing: 16 inches on center.
 3. Orientation: Horizontally.
 4. Provide continuous non-corrosive steel insert for engagement of fasteners, 16 gauge, minimum thickness, with G90 galvanized coating designation in compliance with ASTM A 653/A653M.
 - a. Fully engage steel insert with adjacent rainscreen furring system at ends.
 - b. Anchor sub-girts and other wall cladding support accessories to steel insert set into part of rainscreen furring system.
 5. Provide 3-point compression seal in rainscreen furring sections to ensure insulation panel will not dislodge.
 6. Provide integral anti-siphon grooves on interior and exterior flanges of rainscreen furring.
 7. Provide force distribution zones integrally designed into profile of rainscreen furring.
 8. Surface Burning Characteristics:
 - a. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
 - b. Smoke Developed Index: 450 or less, tested in accordance with ASTM E 84.
 9. Self-Extinguishing: Comply with ASTM D 625.
 10. Adjustable CMH Sub-Framing System: Provide adjustable "GreenGirt Delta Z-Bracket" with integral insulation and rail retention - Dual-Grip.
 - a. Depth: 5 inches.
 - b. Adjustability Range: 5.25 inches to 9.5 inches.
- E. Continuous Insulation (074800.A02): Provide factory-formed edges on insulation panels that interlock with rainscreen furring system components and as specified hereinafter.
1. Polyisocyanurate Panel Insulation: Rigid closed cell foam, complying with ASTM C 1289; Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 3 having a 25-psi compressive strength.
 - a. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
 - b. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
 - c. Thermal Resistance: R-value of not less than 5 long-term per inch, thermal resistance (LTTR).
 - d. Comply with fire-resistance requirements, as indicated as specified herein, and as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 - e. Board edges shall be square.
 - f. Dimensional Stability: Less than 2 percent linear change after 7 days, according to ASTM D 2126.
 - g. Moisture Vapor Permeance: Less than 1 perm, according to ASTM E 96/E96M.
 - h. Water Absorption: Less than 0.05 percent by volume, according to ASTM C 209.
 2. Acceptable Manufacturers:
 - a. Atlas Roof Insulation.
 - b. Hunter Panels, LLC.
 - c. RMAX Operating, LLC.
- F. Accessories:
1. General: Provide all accessories necessary for a complete continuous insulation and rainscreen furring system, including metal closure trim, tie-in brackets, shims, and similar items.
 2. Fasteners: Corrosion-resistant, self-tapping and self-drilling screws, bolts, nuts and other fasteners as recommended by manufacturer of rainscreen furring system to suit installation indicated.
 - a. Cladding to Rainscreen Furring: Self-tapping as recommended by cladding manufacturer, refer to Section 074213.
 - b. Rainscreen Furring to Metal Stud Wall Framing: Use standard, non-corrosive self-tapping metal screws.
 - c. Rainscreen Furring to Concrete and Concrete Unit Masonry: Use standard, non-corrosive screws anchors in pre-drilled holes.
 3. Shims: Provide high impact plastic horseshoe shims as recommended by rainscreen furring system manufacturer as follows:
 - a. Thickness: Behind anchoring flanges of rainscreen furring adjacent to air barrier coating system 1/4 inch. Provide other shim thicknesses as required to suit conditions involved.
 - b. Length and Width: 3 inches long by 2-5/16 inches wide.
 - c. Slot Opening: 7/8 inch.

4. Sealants: Provide sealants as recommended by rainscreen furring system manufacturer for openings within rainscreen furring system and perimeter conditions, and to seal fasteners required for rainscreen furring system to properly seal penetrations in the air barrier.
5. Masonry Anchors for Rainscreen Furring System.
 - a. Basis of Design Product: Subject to compliance with requirements, provide one of the following masonry veneer anchoring systems:
 - b. Masonry anchor products shall be approved in writing by rainscreen furring system manufacturer's technical representative prior to use on this project.
 - c. Masonry anchor products shall be installed as indicated on rainscreen furring system manufacturer's written recommendations and requirements.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Sealants: 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. Provide sealant types that are compatible with panel materials, are non-staining, and do not damage panel finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrates, exterior cladding 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 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 wall panel manufacturer.
 - a. Verify that air/moisture barrier coating has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Verify that mechanical and electrical services for exterior walls have been installed and tested. When appropriate, verify that adjacent materials and finishes are dry and ready to receive insulation.
- C. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to rainscreen furring system installation.
- B. Prepare surfaces using methods recommended by rainscreen furring system manufacturer for achieving best results for substrate under project conditions.
- C. Prepare sub-framing, base angles, sills, furring and other rainscreen furring system members to provide anchorage in accordance with ASTM C 754 for substrate type and exterior wall cladding type indicated in accordance with rainscreen furring system manufacturer's instructions.

3.3 INSTALLATION

- A. Assembly: Assemble continuous insulation and rainscreen furring as a system using manufacturer's procedures and processes identical to tested units, and as necessary to comply with performance requirements indicated and manufacturer's engineering design.
 - 1. Erect rainscreen furring system in sequence according to system manufacturer's installation procedures.
 - 2. Provide spray foam sealant on backside of cantilevered fasteners or actuated fastening tools that completely puncture continuous insulation layer.
- B. Install continuous insulation and rainscreen furring system in accordance with system manufacturer's written installation instructions and approved shop drawings.
 - 1. Install system to fill exterior spaces without gaps and voids, and do not compress insulation panels.
 - 2. Trim insulation neatly to fit spaces and insulate miscellaneous gaps and voids.
 - 3. Fit insulation tight in spaces and tight to exterior side of Mechanical/Electrical services within plane of insulation.
 - 4. Seal gaps, voids and penetrations completely with approved expandable foam sealant on exterior and interior (if visible) before enclosing wall.
 - 5. Seal gaps, voids and penetrations completely with approved sealant that occur within exterior sheathing before enclosing wall.
 - 6. Provide spray foam to seal metal penetrations, including cantilevered fasteners, to prevent interstitial space condensation.
 - 7. Exposed insulation shall be kept dry and shall be protected from open flame. Insulation panels shall not be left exposed to UV in excess of 60 days.
 - 8. Shim and align system to comply with tolerances specified.
 - a. Provide ¼ inch gap between back face of insulation and air/moisture barrier coating.

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal plate wall panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 PROTECTION

- A. Protect installed products from damage during subsequent construction until date of Substantial Completion.
- B. Ensure that insulation panels are not exposed to moisture.
 - 1. Remove wet insulation panels or allow insulation panels to completely dry prior to installation of rainscreen furring system.
- C. Replace damaged insulation panels prior to date of Substantial Completion.

END OF SECTION 074800

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SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Adhered TPO membrane roofing system (075423.A01).
 - 2. Substrate board (for areas with Acoustical Deck) (075423.A15).
 - 3. Self-Adhered Vapor Retarder (for areas with Acoustical Deck) (075423.A16).
 - 4. Roof insulation (075423.A20) and tapered roof insulation (075423.A21).
 - 5. Coverboard (075423.A25).
 - 6. Liquid Flashing (075423.A44).
 - 7. All accessories and fasteners needed to complete the roofing systems indicated.
- B. Related Sections:
 - 1. Section 012300 "Alternates" for those alternates effecting work of this Section.
 - 2. Section 053100 "Steel Decking" for steel decking requirements and installation.
 - 3. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 4. Section 072500 "Weather Barriers" for installation requirements involving weather barriers.
 - 5. Section 072726 "Fluid Applied Air Barriers" for installation requirements involving fluid applied air barriers.
 - 6. Section 076200 "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings and roof expansion joints.
 - 7. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
 - 8. Division 22 for roof drains.
- C. Products Installed but not Furnished in this Section:
 - 1. Acoustical insulation strips and mesh spacers for metal acoustical roof deck, refer to Section 053100.

1.2 DEFINITIONS

- A. TPO: Thermoplastic polyolefin.
- B. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roofing Systems" for definitions of terms related to roofing work in this Section.

1.3 SYSTEM DESCRIPTIONS

- A. Adhered TPO Roofing System (at Acoustical Steel Decks). Roofing system shall consist of the following components as specified within this Section and related Sections. Components are described in assembly from bottom up to top application.
 - 1. Basis of Design: Elevate UltraPly TPO and XR Bonding Adhesive
 - 2. Substrate board, mechanically fastened to acoustical deck.
 - 3. Vapor Retarder, self-adhered to substrate board.
 - 4. Polyisocyanurate roof insulation adhered to vapor retarder.
 - 5. Cover board, adhered to roof insulation.
 - 6. TPO Roofing Membrane, adhered to coverboard.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site approximately two weeks prior to scheduled commencement roofing installation. Conference shall be conducted concurrently with preinstallation conference for sheet metal flashing and trim.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, leak detection system installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment. Record discussions of conference and decisions and agreements (or disagreements) reached and furnish copy of record to each party attending.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review roofing systems requirements (drawings, specifications, and other contract documents).
4. Review required submittals, both completed and yet to be completed.
5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
6. Tour representative areas of roof substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades. Identify and record items to be corrected prior to commencement of work of this Section.
 - a. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
7. Review structural loading limitations of roof deck during and after roofing.
8. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
9. Review governing regulations and requirements for insurance and certificates if applicable.
10. Review temporary protection requirements for roofing system during and after installation.
11. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required.
 1. Include data and certified test reports substantiating that materials comply with requirements.
 - a. Submit Underwriter's Laboratory material and systems approvals.
 2. Submittals shall be reviewed and accepted by roofing membrane manufacturer's technical representative with a submittal cover letter stating all products for the roof assembly including roofing membrane, base flashing, and roof insulation are acceptable.
- B. Shop Drawings: For roofing system. Include plans, sections, details, and attachments to other work. Indicate dimensions, general construction, specific modifications, component connections, details at adjoining construction and roof top accessories, anchorage methods, hardware and installation procedures, plus the following specific requirements:
 1. Indicate base flashing and membrane terminations and, details for perimeter, penetrations, field fabricate curbs and tie-in flashing details.
 2. Indicate layout and thicknesses for insulation.
 3. Indicate layout, slopes and thicknesses for tapered insulation and crickets.
 4. Roof plan showing orientation of each type of roof deck and orientation of membrane roofing and fastening spacings.
 5. Insulation sheet layout and fastening patterns for corner, perimeter, and field-of-roof locations to comply with performance requirements specified. If insulation and cover board is adhered with low rise foam adhesive, indicate adhesive ribbons patterns.
 6. Shop drawings shall be reviewed and accepted by roofing membrane manufacturer's technical representative. A shop drawing cover letter shall be submitted by the roofing membrane manufacturer's technical representative stating all products for the roof assembly including roofing membrane, base flashing and roof insulation are acceptable.
 - a. Shop drawings for Section 076200 "Sheet Metal Flashing and Trim" shall be reviewed concurrently with shop drawings for this Section.
- C. Samples for Verification: For the following products:
 1. Roof membrane and flashing, of color required.
 - a. White
- D. Wind Uplift Resistance Submittal: For roofing system indicating compliance with wind uplift performance requirements.

- E. Roof Assembly Certification Letters: Manufacturer of primary roof system components shall submit letter certifying that the roofing system will achieve specified warranty, that roofing system components are acceptable and will meet performance requirements specified.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and manufacturer.
- B. Manufacturer Certificates:
 - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of compliance with performance requirements.
 - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- C. Certification of Installer:
 - 1. Submit written certification from manufacturer of primary roofing materials that roofing contractor is capable of providing warranty for specified duration.
- D. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.
- E. Field quality-control reports.
- F. Sample Warranties: Sample of manufacturer's special warranty applications.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.
- B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is approved for membrane roofing system identical to that specified for this Project.
- B. Installer Qualifications: The Roofing Contractor shall perform the work of this Section; and shall be a firm with not less than seven (7) years of successful experience in installation of TPO roofing systems similar to those required for this project.
 - 1. Roofing Contractor shall be 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.
 - 2. Contractor must be a member of NRCA or one of its affiliates.
 - 3. Roofing Contractor must have successfully completed 4 projects of comparable scale within the past two years using the specified system.
 - 4. Installer Certification: Obtain written certification from manufacturer of roofing system certifying that Installer is approved by manufacturer for installation of specified roofing system. Provide copy of certification to Architect prior to award of roofing work.
 - 5. Installer's Field Supervision: Require Installer to maintain a full-time supervisor/foreman who is on jobsite during times that roofing work is in progress and who is experienced in installation of roofing systems similar to type and scope required for this Project.
 - 6. All roofing shall be installed by employees of the installer; contract labor is not allowed.
- C. Insurance Certification: Assist the Owner in preparation and submittal of roof installation certification as may be necessary with fire and extended coverage insurance on roofing and associated work.

- D. UL Listing: Provide TPO roofing system materials which have been tested for application and slopes indicated and are listed by Underwriter's Laboratories, Inc. (UL) for external fire exposure class specified.
 - 1. Provide roof covering materials bearing Classification Marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-up Service.
 - 2. Provide roof insulation approved in writing by roof system manufacturer as acceptable substrate for this project.
 - 3. Provide roofing system that can be installed to comply with UL 790 requirements specified for resistance to external fire.
- E. Product/Material Qualifications:
 - 1. Components of the roofing system shall be manufactured or approved by the roofing system manufacturer to comply with warranty and construction class requirements.
 - 2. Fastener corrosion resistance shall be in accordance with FM Standard 4470.

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. Where heavy loads are placed upon or transported over decking and where materials are repeatedly landed, provide temporary planking or plywood to distribute imposed loads.
- E. Comply with fire and safety regulations.

1.10 PROJECT CONDITIONS

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

1.11 WARRANTY

- A. Installer's Special Project Warranty: Submit two (2) executed copies of MRCA Roofing Contractor Materials and Workmanship Warranty; current Form, for a period of two (2) years, covering work of this Section including roof membrane, composition flashing, roof insulation, fasteners, walkway pads and roofing accessories, all stated on face of Warranty, signed and counter signed by Installer (Roofer) and Contractor.
- B. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's "Full Systems – No Dollar Limit" material and workmanship warranty. Submission shall include a written description of specified services as noted below and shall be endorsed by the Manufacturer's Technical Director. Warranty shall be from the decking up, including roofing system, and metal flashing endorsement signed by authorized representative of roofing system manufacture, on form which was published with product literature as of date of contract documents, for the following period of time:
 - 1. Twenty (20) years, "No Dollar Limit" from date of Substantial Completion. This warranty shall include the following:
 - a. Membrane roofing, base flashings, roof insulation, fasteners, cover boards, and other components of membrane roofing system.

- b. Liquid flashing for strip in flashing and pourable sealer pockets and other applications.
 - 2. Manufacturer shall provide the warranty inspection of the roofing system.
 - 3. Manufacturer shall provide a two-year re-inspection of the roofing system at no cost to the Owner.
- C. Existing Warranted Roofs: At locations where the existing roof is currently under warranty, all work performed shall be verified by all parties involved in the original warranty and coordinated so that work performed will preserve existing warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain components including roof insulation for membrane roofing system or approved by membrane roofing manufacturer. Secondary components shall be from a manufacturer approved by membrane roofing manufacturer.
- B. 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. Carlisle SynTec Incorporated.
 - 2. Elevate (formerly Firestone Building Products).
 - 3. Johns Manville.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane 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. Membrane 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.
 - 3. Roofing system shall be an FM approved system.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. FM Approvals Listing and Performance: Project is not insured by FM Global, however materials and components shall meet FM "approvals" requirements. Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
 - 1. Fire/Windstorm Classification: Class 1-90.
 - 2. Hail Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 SH (severe hail) with 1/2" coverboard.
- D. Solar Reflectance Index: Not less than 80 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- E. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- F. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.76 and an emissivity of not less than 0.90 when tested according to CRRC-1.
- G. 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.
- H. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

1. Underwriter's Laboratories, Inc. (UL); roof covering shall meet external fire exposure Class A material rating.

2.3 TPO MEMBRANE ROOFING

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.
 1. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
 2. Thickness: 60 mils, minimum.
 3. Exposed Face Color: White

2.4 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing and other roofing components.
 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Base/Sheet Flashing (075423.A10): As recommended by roof membrane manufacturer.
- C. Vertical Wall Flashing (075423.A11): Match roof ply.
- D. Sheet Flashing (075423.A14): Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.
- E. Prefabricated Pipe Flashings (075423.A14): As recommended by roof membrane manufacturer.
- F. Slip Sheet: Same as field membrane. Provide beneath each splash block. Cut to extend 2 inches past both sides and both ends of splash block.
- G. Liquid Flashing (075423.A44): Manufacturer's standard reinforced liquid flashing system, same color as sheet membrane.
- H. Bonding Adhesive: Manufacturer's standard.
- I. Metal Termination Bars (075423.A40): Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- J. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to TPO roofing manufacturer.
- K. Premanufactured Pourable Sealer Pockets (075423.A45): A pre-fabricated interlocking pourable sealer pocket system filled with fast setting, solvent free, multi-use waterproof sealer. Prefabricated pockets connect with tongue and groove joints and are composed of high strength, flexible polyurethane elastomer. Pieces join together to create pockets of varying sizes.
 1. Basis-of-Design product: "Lockin' Pocket Interlocking Pitch Pocket System" by Weather-Tite
 2. Product Characteristics:
 - a. Pocket and Sealer Color: White.
 - b. Height: 4 inches tall above field of roof.
 - c. Warranty: Not less than 24 months.
 3. Prepare Substrates and install pourable sealer pockets in accordance with manufacturer's written instructions to accommodate substrates involved.
- L. Miscellaneous Accessories: Provide pourable sealer pockets, pourable sealer, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories as indicated and as necessary for a complete, proper and watertight roofing system.
 1. Provide flashing accessories of same color as roofing membrane when possible.
 2. Provide all pre-manufactured accessories as required by roofing system manufacturer to achieve warranty/guarantee specified.

2.5 SUBSTRATE BOARD (075423.A15)

- A. Substrate Board (Acoustical Steel Deck) (075419.A15): ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 - 1. Thickness: 1/2 inch.
 - 2. Surface Finish: Unprimed.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.6 VAPOR RETARDER (075423.A16)

- A. Self-Adhered Sheet Vapor Barrier: ASTM D1970/D1970M, polyethylene film laminated to layer of rubberized asphalt adhesive: cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor retarder manufacturer.
 - 1. Manufacturers and Products: Subject to compliance with requirements, provide one of the following or a comparable product submitted to and accepted by Architect with the following product characteristics:
 - a. "VapAir Seal 725TR" by Carlisle Syntec Systems.
 - b. "SA Vapor Retarder" by GAF.
 - c. "JM Vapor Barrier SA" by Johns Manville.
 - d. "Enverge Air & Vapor Barrier SA Membrane" by HolcimElevate (Formerly Firestone Building Products Company, LLC).
 - e. "Vapor Retarder SA-31" by Sika/Sarnafil.
 - 2. Product Characteristics:
 - a. Thickness: Not less than 31 mils per ASTM D1970 or ASTM D5147.
 - b. Tensile Strength: Not less than 250 psi per ASTM D412 or not less than 54 lbf/in machine direction and 68 lbf/in cross machine direction per ASTM D5147.
 - c. Elongation: not less than 250 percent per ASTM D412 or not less than 33% machine direction and 20% cross machine direction per ASTM D5147.
 - d. Peel Adhesion: 5 lbs/in per ASTM D903.
 - e. Puncture Resistance: 90 lbf minimum per ASTM E154.
 - f. Permeability: Not more than 0.03 perms per ASTM E96 or ASTM D1970.
 - 3. Accessories: Provide pressure sensitive tape, lap adhesive, primer and related accessories necessary for complete and proper installation that are recommended by vapor barrier manufacturer to suit conditions involved.

2.7 ROOF INSULATION

- A. General: If one of the approved roof insulation systems is provided that alters the system thickness from that specified, Contractor is responsible for any additional cost to add additional courses of cut brick or changes in wood blocking, flashing, gravel, guards, etc.
 - 1. Provide preformed roof insulation boards manufactured or approved by roof membrane manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated, and approved for use in roof assemblies specified.
- B. Insulation Products: Acceptable products must be approved by the roofing system manufacturer.
 - 1. Approved insulation meeting requirements specified for Class A for fire resistance.
 - 2. Approved insulation meeting wind uplift resistance requirements specified.
- C. Polyisocyanurate Board Insulation (075423.A20): ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Provide insulation in two layers, with both layers at least 2.6 inches thick.
 - 2. Mechanically fastened first layer to deck to meet wind uplift requirements specified. All subsequent layers shall be installed with adhesive to meet wind uplift requirements.
 - a. Note: At areas where vapor retarder occurs, adhere first layer of insulation in lieu of mechanically fastening.

3. Total thickness of insulation shall not be less than 5.2 inches. Thickness at roof drains shall be 2.6 inches, minimum.
 4. Each layer of insulation shall provide a minimum aged R-value of 15.0.
 5. Total aged R-value for roof insulation shall not be less than R-30.
- D. Tapered Polyisocyanurate Insulation (075423.A21): Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, and 1/2 inch per 12 inches at crickets and saddles, unless otherwise indicated.

2.8 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- D. Cover Board (075423.A25): ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 1. Thickness: 1/2 inch.
 2. Surface Finish: Primed.
 3. Cover Board Adhesive: Match insulation adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Provide temporary barricades and other forms of protection for Owner's personnel and public from injury due to demolition work.
 1. Protect from damage, existing finish work that is to remain in place and becomes exposed during demolition operations.
 2. Protect against any material or debris dropping into the building or damaging new roof membrane.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions and to meet performance requirements specified.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under Section 072726 "Fluid-Applied Air Barrier Coatings."
- D. Cooperate with inspection and test agencies engaged or required to perform services in connection with roofing system installation.
- E. Protect other work from spillage of roofing materials and prevent liquid materials from entering or clogging drains and conductors. Protect lawn areas, building walls and windows and building equipment. Replace/restore other work damaged by installation of roofing system work.
- F. Cutoffs: At end of each day's roofing installation, protect exposed edge of incomplete work, including insulation. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Provide temporary tie off and remove tie-off at beginning work on adjoining roofing.
- G. Coordinate flow of work, equipment, materials and personnel to eliminate traffic across completed new roofing systems. Provide plywood walkways for the movement of personnel, equipment and materials.
- H. Roof surfaces shall be thoroughly dry before application of roofing.
- I. Install roofing and auxiliary materials to tie into existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.
- J. Roofing Manufacturer's Inspection: Inspection of roofing shall be made by a responsible representative of the roofing manufacturer during application and after completion.
- K. When application of roofing is begun, total roof system shall be completed before end of day and before wet by elements. Install water cut-off at completion of each day's work and remove upon resumption of work. Precautions shall be taken to protect membrane from punctures.

3.4 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 - 1. Fasten substrate board to top flanges of steel deck to meet wind uplift requirements.

3.5 VAPOR RETARDER INSTALLATION

- A. General: Prior to application of substrate board, install acoustical insulation and mesh spacers into pans of acoustical roof decking furnished under Section 053100 from the acoustical deck contractor.
- B. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 and 6 inches, respectively.
 - 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 - 2. Seal laps by rolling.
 - 3. Coordinate installation and transition of roofing vapor retarder with air barrier specified in Section 072726.

- C. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSULATION INSTALLATION

- A. Installation of Acoustical Insulation and Mesh Spacers for Acoustical Roof Deck:
 - 1. Prior to placement of acoustical insulation strips and mesh spacers, clean perforated pan of acoustical deck of all debris, grease, oil, water and other foreign matter.
 - a. Acoustical insulation strips shall be dry before installation of overlying roof materials.
 - 2. Place mesh spacers in the perforated pan area of the acoustical deck between the dovetail-shaped ribs. Spacers shall be butted together to form continuous runs.
 - 3. Place strips of acoustical insulation over mesh spacers in pans between ribs. Tightly butt insulation together to form continuous runs.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation and as follows:
 - 1. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
 - 2. Install tapered insulation under area of roofing to conform to slopes indicated.
 - 3. Install insulation under area of roofing to achieve required thickness.
 - 4. At concrete decks and decks where vapor retarder is specified, adhere first layer of insulation in place.
- C. Installation Over Metal Decking:
 - 1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Locate end joints over crests of decking.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch with insulation.
 - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - g. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
 - 2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
 - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
 - b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - f. Trim surface of insulation where necessary and at roof drains so completed surface is flush and does not restrict flow of water.
 - g. Create insulation sumps at through-gravelstop scuppers, as indicated.
 - h. Fill gaps exceeding 1/4 inch with insulation.
 - i. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - j. Adhere each layer of insulation to substrate using low-rise foam adhesive to meet wind uplift performance requirements specified and as follows:
 - 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
 - 1. Loosely butt cover boards together.
 - 2. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 3. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 - 4. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 5. Adhere cover board to substrate using adhesive to meet wind uplift performance requirements specified and as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane 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 membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeters.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane 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 membrane.
 - 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 does not comply with requirements.
- H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
- I. Install membrane roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing membrane roofing system.

3.9 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply 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.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. The roofing membrane manufacturer's technical representative shall perform the following list of pre-construction or construction services:
 - 1. Review and accept submittals.
 - 2. Review and accept shop drawings.
 - 3. Attend a pre-application roofing conference.
 - 4. Conduct a project start-up site visit, typically the first or second day of roof construction.
 - 5. Conduct final inspection of completed roofing system and flashings.
 - 6. Each observation shall include written reports accompanied with digital photographs.
- C. Project Startup Inspection: Arrange and coordinate for roofing system manufacturer's technical personnel to inspect project on the first or second day of roof construction.
- D. Interim Roof Inspections: Arrange and coordinate for roofing system manufacturer's technical personnel to inspect project once per every two weeks of roof construction, minimum.
- E. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
 - 1. Notify Architect 72 hours in advance of final roof inspection.
- F. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- G. Roofing system will be considered defective if it does not pass tests and inspections.
 - 1. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 PROTECTING AND CLEANING

- A. Clean all roof areas prior to turning Project over to Owner.
- B. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- C. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
 - 1. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formed Products:
 - a. Formed roof drainage sheet metal fabrications.
 - b. Formed low-slope roof sheet metal fabrications.
 - c. Formed wall sheet metal fabrications.
 - d. Formed equipment support flashings.
- B. Related Sections:
 - 1. Section 012300 "Alternates" for those alternates affecting work of this Section.
 - 2. Section 042000 "Unit Masonry" for masonry through wall flashing.
 - 3. Section 061000 "Rough Carpentry " for wood nailers, curbs, and blocking.
 - 4. Section 072100 "Thermal Insulation"
 - 5. Section 074213 "Formed Metal Wall and Soffit Panels" for sheet metal flashing and trim integral with metal coping and prefinished sheet metal flashing.
 - 6. Section 075423 "TPO Roofing" for installing sheet metal flashing and trim integral with roofing.

1.2 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints and seams to provide leakproof, secure and non-corrosive installation.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct Conference at Project Site.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs and condition of other construction that affects sheet metal flashing and trim.
 - 3. Review requirements for insurance and certificates, if applicable.
 - 4. Review sheet metal flashing observation and repair procedures – post flashing installation.
 - 5. Meet with Owner, Architect, Installer and other Installers whose work interfaces with or affects sheet metal flashing and trim – including installers of roofing materials, roof accessories and roof-mounted equipment.
 - 6. Review methods and procedures related to sheet metal flashing and trim.
 - 7. Review special roof details, roof drainage, roof penetrations, equipment curbs and condition of other construction that will affect sheet metal flashing.
 - 8. Review sequencing of sheet metal flashing installation with other related trades to coordinate installation.
 - 9. Document proceedings, including corrective measures and actions required, and furnish copy of records to each participant.

1.4 ACTION 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 manufactured product and accessory.

- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
1. Identification of material, thickness, weight, and finish for each item and location in Project.
 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 4. Details of termination points and assemblies, including fixed points.
 5. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashing as applicable.
 6. Details of special conditions and of connections to adjoining work.
 7. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.
 8. Include details of roof-penetration flashing.
 9. Include details of expansion joints and expansion-joint covers – show direction of expansion and contraction joints from fixed points.
 10. Shop drawings for Section 076200 "Sheet Metal Flashing and Trim" shall be reviewed concurrently with shop drawings for the following sections:
 - a. Section 075423 "Thermoplastic Polyolefin (TPO) Roofing."
- C. Samples for Verification: For each type of exposed finish required, prepared on 6 inch square samples of actual metal to be used in the work.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified fabricator.
- B. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.
- C. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
1. For copings and roof edge flashings that are SPRI ES-1 compliant, shop shall be SPRI ES-1 certified and listed as able to fabricate required details as tested and approved.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual", Current Edition, unless more stringent requirements are specified or shown on Drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.8 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows 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 Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
 - 1. Sheet metal flashings shall be installed in accordance with ANSI/SPRI/FM 4435/ES-1 "Wind Design Standard for Edge Systems used with Low Slope Roofing Systems" as applicable for locations and configurations indicated on Drawings.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- D. Fabricate and install roof edge flashing capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent 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: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
 - 1. Contractor shall use gauges or thicknesses specified or as prescribed in the referenced standards for specific girths, whichever is greater.
- B. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
 - 2. Surface: Smooth, flat.
 - 3. Exposed Coil-Coated Finish:
 - a. 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.
 - 4. Colors: As selected by Architect from manufacturer's full range. Refer to Exterior Finish Legend for color matching requirements for sheet metal flashing and trim installed adjacent to metal wall panels, storefront and curtain wall.
 - 5. 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.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet (076200.A01): Minimum 30 to 40 mils () thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer and compatible with self-adhering air barrier transition membrane.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
 - 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
- B. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.
- C. Flexible Membrane Closure (076200.A04): EPDM Sheet membrane; at roof expansion joints provide non-reinforced flexible, black EPDM synthetic rubber sheet flashing of 45 to 60 mils thickness. EPDM sheet shall have a tensile strength of not less than 1200 psi, a tear resistance of at least 20 lbs per inch and an ultimate elongation of at least 250 percent. Provide with seam and splice tape, adhesives and all other accessories required for proper and watertight installation.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 - 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Termination Bars: Provide stainless steel or aluminum bars; 1/8" thick with a 1" face and 8'-0" length. Bars shall be predrilled at 8" centers starting 4" in from each end. Sealant shall be MasterSeal NP150 by BASF.
 - 1. Provide at building expansion joint bellows and other locations as necessary for proper watertight installation.
 - 2. Where installations occur adjacent to or in conjunction with fluid applied air barrier systems, coordinate installations and products with manufacturer of fluid applied air barrier system written recommendations. Refer to Section 072726 for additional information.
- D. Solder:
 - 1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.
- E. Sealant Tape (076200.A02): Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch wide and 1/8 inch thick.
- F. Elastomeric Sealant (076200.A03): ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

- H. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- I. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- J. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch () offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- F. Cleats (076200.A36): Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
 - 1. Cleats for coping, gravel stop edges and fascia caps shall be fabricated from not less than 0.040 inch thick (20 gauge) galvanized steel and shall be continuous 10 foot lengths with ¼ inch gap between sections.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- H. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Splash Pans (076200.A10): Fabricate from the following materials:
 - 1. Galvanized Steel: 0.034 inch thick.
 - 2. Fabricate similar to SMACNA (Current Edition), Figure 1-36. Fabricate with 2 to 3 corrugations.
- B. Splash Block (076200.A10):
 - 1. Materials: Fabricate from UV-resistant precast 5,000 p.s.i. concrete 28 days reinforcement with grade 60 steel. Basis of Design: Century Group.
 - 2. Minimum dimension: 4"H x 12"W x 30"L.
 - 3. Weight: 48 lbs.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop 076200.A11) and Fascia (076200.A12): Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long sections. Furnish with 6 inch wide cover plates. Shop fabricate interior and exterior corners.
1. Joint Style: Butted with expansion space and 12-inch-wide, concealed backup plate.
 2. Fabricate edging similar to SMACNA (Current Edition), Figures 2-1B and 2-5C.
 3. Fabricate fascia similar to SMACNA (Current Edition), Figures 2-7A and 2-7B.
 - a. Coil-Coated Galvanized Steel: 0.034 inch thick.
- B. Copings and Caps (076200.A13): Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight.
1. Coping Profile: Similar to SMACNA figures designation 3-1A, 3-4A and 3-8D.
 2. Cap Profile: Similar to SMACNA figure designation 4-5C, with 4inch high flange.
 3. Joint Style:
 - a. At coping: Similar to SMACNA, Figure 3-1, Detail 2, with drive cleat over top and "J1" 3-inch lap joint on vertical faces.
 - b. At caps: Similar to SMACNA, Table 3-1, joint "J2" with butt and backup plate.
 4. Fabricate from the following materials:
 - a. Coil-Coated Galvanized Steel: 0.034 inch thick.
- C. Roof to Wall Transition Expansion-Joint Cover (076200.A15): Fabricate from the following materials:
1. Coil-Coated Galvanized Steel: 0.034 inch thick.
 2. Fabricate roof-to-wall expansion joint similar to SMACNA (Current Edition), Figures 5-1 and 5-6B.
 3. Where expansion joint occurs beneath metal wall panels, vertical legs of receiver shall be 4 inches tall and extend up behind weather resistive barrier/air barrier transition flashing.
- D. Counterflashing (076200.A18): Fabricate from the following materials:
1. Coil Coated Galvanized Steel: 0.034 inch thick.
 2. Fabricate similar to SMACNA (Current Edition), Figure 4-4D, spring action and two piece (with receiver).
 3. Where indicated, fabricate counterflashing with integral reglet flange similar to SMACNA (Current Edition), Figure 4-4B.
- E. Flashing Receivers (076200.A19): Fabricate from the following materials:
1. Stainless Steel: 0.019 inch thick.
 2. Where receivers are indicated to project through exterior wythe, horizontal leg of receiver shall be 3 to 3-1/2 inches long.
 3. Where receivers are cut-in to masonry joint or partially embedded in masonry joint, fabricate similar to SMACNA (Current Edition), Figure 4-4C.
 4. Where receivers are mechanically fastened to vertical surface, vertical leg of receiver shall be at least 4 inches tall, similar to SMACNA, Figure 4-5C with receiver formed similar to Figure 4-4D.
- F. Roof-Penetration Flashing (076200.A20): Fabricate from the following materials:
1. Coil-Coated Galvanized Steel: 0.034 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
1. Coil-Coated Galvanized Steel: 0.034 inch thick.

2.9 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing (076200.A33): Fabricate from the following materials:
1. Galvanized Steel: 0.034 inch thick.

- B. Pre-Finished Miscellaneous Metal Flashing and Trim (076200.A35): Fabricated from the following materials:
 - 1. Coil-Coated Galvanized Steel: 0.034 inch thick.
 - 2. Stainless Steel: 0.031 inch thick.
 - 3. At metal wall panels, fabricate to configurations indicated, with vertical leg not less than 4 inches tall to extend up and behind rigid insulation. Fabricate ends of flashing with end dams not less than 2 inches tall, and extending out to face of wall panel.
 - 4. At pan flashing for windows, storefront and curtain wall; fabricate to configurations indicated, with horizontal leg to extend 2 inches beneath window, storefront or curtain wall sill as occurs.
 - 5. Fabricate trim to configurations indicated.
 - 6. Fabricate pre-finished miscellaneous metal flashing in lengths of 8 to 10 feet. Overlap adjoining pieces 4 inches and seal joint watertight.

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.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. For the record, 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 UNDERLAYMENT INSTALLATION

- A. General: Install underlayment as indicated on Drawings.
- B. Self-Adhering High Temperature Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
- C. Flexible Membrane Closure EPDM Underlayment: Install EPDM underlayment wrinkle free and continuously sealed between sheets and all laps for watertight installation at roof expansion joints to form a bellows. Install an additional sheet over the top of coping, wall caps, and expansion joint bellows securely attached to wall substrate and adhered to over top of blocking/curb and turned down 1-1/2 inches.
 - 1. Where indicated at expansion joints in vertical walls behind cavity insulation and foam-board air barrier, provide flexible membrane closure bellows. Secure to both substrates and seal edges and laps in accordance with membrane manufacturer's written recommendations.
- D. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches apart. Anchor individual cleats with two fasteners and bend tabs over fasteners. At continuous cleats, interlock bottom edge of roof edge flashing with continuous cleat. Anchor continuous cleat to substrate at 2 inches in from each end and then at not greater than 12-inch centers. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. All lap joints in pre-finished miscellaneous metal flashing shall be sealed watertight.
 7. Torch cutting of sheet metal flashing and trim is not permitted.
 8. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of EDPM underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. 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.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- E. Seal joints as shown and as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. 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. Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder metallic-coated steel sheet.
 2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 3. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
- G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inch in direction of water flow. Provide EPDM bellows and EPDM cap flashing beneath expansion joint cover as specified.

3.4 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Splash Pans: Install where downspouts discharge on low-slope roofs. Set on slip sheet strip cut from extra cap sheet.

3.5 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 2 inches in from each end and then at not greater than 12-inch centers.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 2 inches in from each end and then at not greater than 12-inch centers.
 - 2. Anchor interior leg of coping with screw fasteners and washers at 16 inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.
- G. Pourable Sealer Pocket Installation: Prepare substrates and install pockets in strict accordance with pocket manufacturer's written instructions to accommodate substrates involved.

3.6 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 "Unit Masonry."
- C. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend ()4 inches beyond wall openings.

3.7 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.
- B. Pre-Finished Miscellaneous Metal Flashing: Coordinate installation of flashing with adjoining construction and air barrier coating. Seal lap joints watertight.

3.8 PRE-MANUFACTURED BELLOW-TYPE EXPANSION JOINT INSTALLATION

- A. Install tubular fill at top of expansion joint opening to provide a tight fit. Filler shall extend slightly above top of expansion joint to support bellow-type expansion joint. Install filler continuously, tightly butting sections together.

- B. Install bellows-type expansion joint cover in strict accordance with cover manufacturer written instruction to provide a weather-tight installation. Securely fasten flanges to adjacent construction.

3.9 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.10 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.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers' written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls and floors
- B. Related Sections:
 - 1. Division 07 Section "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction, at exterior curtain wall/floor intersections, and in smoke barriers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
 - 1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 - 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Classification markings on penetration firestopping correspond to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
- C. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grace Construction Products.
 - 2. Hilti, Inc.
 - 3. Johns Manville.
 - 4. Specified Technologies Inc.
 - 5. 3M Fire Protection Products.
 - 6. Tremco, Inc.; Tremco Fire Protection Systems Group.
 - 7. USG Corporation.
- B. Single Source Responsibility: All firestopping insulation, sealants, and related firestopping accessories required to prevent the passage of fire and smoke through fire rated penetrations, smoke rated penetrations and joints shall be furnished and installed by (or installed under direct supervision of) one contractor for the entire project. All products used for this work shall be furnished by one manufacturer for the entire project.

2.2 PENETRATION FIRESTOPPING (078413.A01)

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist 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.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. Fire-resistance-rated walls include fire walls, fire-barrier walls, and fire partitions.
 - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.

- E. 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 manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fillers for sealants.
 - 2. Substrate primers.
 - 3. Collars.
- F. Firestopping compounds shall be paintable or capable of receiving finish materials in areas which are exposed to view and scheduled to receive finishes.

2.3 FILL MATERIALS

- A. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- B. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- C. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- D. 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 non-shrinking, homogeneous mortar.
- E. 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.
- F. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping 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: Clean out openings immediately before installing penetration firestopping 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.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: 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 penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping 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 fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 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. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. 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. Firestopping Manufacturer's representative shall perform and inspections of penetration firestopping. Contractor shall notify Architect and manufacturer's representative no later than seven days after penetration firestopping is complete to schedule inspection.
 - 1. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
 - 2. Proceed with enclosing penetration firestopping 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 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 is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

END OF SECTION 078413

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SECTION 078446 - FIRE RESISTIVE JOINT SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Joints in or between fire-resistance-rated constructions. (078446.A01).
- B. Related Sections:
 - 1. Division 07 Section "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.
 - 1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.

1.4 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 UL's "Qualified Firestop Contractor Program Requirements." Firm shall be experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:
 - 1. Fire-resistive joint system tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:
 - a. Fire-resistive joint system products bear classification marking of qualified testing agency.
 - b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

PART 2 PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS (078446.A01)

- A. Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint 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 fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:
 - 1. Joints include those installed in or between fire-resistance-rated walls floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
 - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
 - 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Grace Construction Products.
 - b. Hilti, Inc.
 - c. Johns Manville.
 - d. Specified Technologies Inc.
 - e. 3M Fire Protection Products.
 - f. Tremco, Inc.; Tremco Fire Protection Systems Group.
 - g. USG Corporation.
- C. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
 - 1. Sealant shall have a VOC content of 250 g/L or less.
- D. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.
- E. Firestopping compounds shall be paintable or capable of receiving finish materials in areas which are exposed to view and scheduled to receive finishes.

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: Clean joints immediately before installing fire-resistive joint systems 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 fill materials.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint 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 the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. 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 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 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 fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 - 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. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels will be visible to anyone seeking to remove or penetrate joint 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 - Fire-Resistive Joint System - 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: Fire-Resistive Joint System manufacturer's representative will perform inspections of completed installation of work of this Section. Contractor shall notify Architect and manufacturer's representative not later than seven days after completion of fire-resistive joint system installation to schedule inspection.
- B. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.
- C. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint 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 fire-resistive joint systems are without damage or deterioration at time of Substantial 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.

3.7 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.
- B. Wall-to-Wall, Fire-Resistive Joint Systems:
 1. UL-Classified Systems: WW-S-0000-0999.
 2. Assembly Rating: 2 hours.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class II - 25 percent compression or extension.
 5. L-Rating at Ambient: As selected by Contractor to suit project conditions.
- C. Floor-to-Wall, Fire-Resistive Joint Systems:
 1. UL-Classified Systems: FW-S-0000-0999.
 2. Assembly Rating: 2 hours.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class II - 25 percent compression, extension, or horizontal shear.
 5. L-Rating at Ambient: As selected by Contractor to suit project conditions.
- D. Head-of-Wall, Fire-Resistive Joint Systems (for Fire-Resistive Roof Systems):
 1. UL-Classified Systems: HW-S-0000-0999.
 2. Assembly Rating: 2 hours.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class II - 25 percent compression or extension.
 5. L-Rating at Ambient: As selected by Contractor to suit project conditions.
- E. Head-of-Wall, Fire-Resistive Joint Systems (for Non-Fire-Resistive Roof Systems):
 1. UL-Classified Systems: CJ-S-0000-0999.
 2. Assembly Rating: 2 hours.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class II - 25 percent compression or extension.
 5. L-Rating at Ambient: As selected by Contractor to suit project conditions.

F. Perimeter Fire-Resistive Joint Systems:

1. UL-Classified Perimeter Fire-Containment Systems: CW-S-0000-0999.
2. Integrity Rating: 2 hours.
3. Insulation Rating: 1 hour.
4. Linear Opening Width: As indicated.
5. Movement Capabilities: Class II - 25 percent compression or extension.
6. L-Rating at Ambient Temperature: As selected by Contractor to suit project conditions.

END OF SECTION 078446

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SECTION 079200 - JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Latex joint sealants.
 - 4. Polyurea joint sealants.
 - 5. Hybrid silicone sealants.
 - 6. Polyether Sealants.
- B. Related Sections:
 - 1. Section 078413 "Penetration Firestopping" for sealing penetrations in fire-resistance-rated construction.
 - 2. Section 078446 "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
 - 3. Section 088000 "Glazing" for glazing sealants.
 - 4. Section 092900 "Gypsum Board" for acoustical sealant and sealing acoustical joints.
 - 5. Division 32 Section "Concrete Paving Joint Sealants" for sealing joints in pavements, walkways, and curbing.

1.2 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each application indicated below:
 - a. Each kind of sealant and joint substrate in exterior walls.
 - b. Sealant around perimeter of exterior windows/storefront.
 - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 - 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. 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.

- D. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- C. Field-Adhesion Test Reports: For each sealant application tested.
- D. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
 - 1. Refer to Section 042000 "Unit Masonry" for sealant joint in masonry mockups.
- D. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which 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: Five years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from natural 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 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Sealants and sealant primers shall comply with the following:
 - 1. Architectural sealants shall have a VOC content of 250 g/L or less.
 - 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 - 3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- G. Keynote Designations: Refer to schedule at end of this Section for types and applicable substrates.
 - 1. Sealant: (079200.A01).
 - 2. Sealant with backer rod: (079200.A02).
 - 3. Acoustical sealant: (079200.A04): Refer to Section 092900.
 - 4. Tape Sealant (079200.A05).

2.2 SILICONE JOINT SEALANTS

- A. Single-Component, Non-Staining, Non-sag, Ultra Low Modulus, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50 minimum, for Use NT.
 - 1. Products:
 - a. Tremco Incorporated; Spectrem 1.
 - b. Sika; Sikasil WS 290 FPS.
 - c. Dow; Dowsil 756 SMS Building Sealant.
 - d. Pecora; 890NST.
- B. Single-Component, Non-Staining, Non-sag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50 minimum, for Use NT.
 - 1. Products:
 - a. Tremco Incorporated; Spectrem 2.
 - b. Sika; Sikasil WS-295 FPS.
 - c. Dow; Dowsil 756 SMS Building Sealant.
 - d. Pecora; 890NST.
- C. Single-Component, Non-sag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
 - 1. Products:
 - a. Dow; Dowsil 790 Silicone Building Sealant.
 - b. Sika; Sikasil 728 NS.
 - c. Pecora Corporation; 311 NS.

- D. Mildew-Resistant, Single-Component, Non-sag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25 minimum, for Use NT.
 - 1. Products:
 - a. Tremco Incorporated; Spectrem 2.
 - b. Sika; Sikasil GP.

2.3 URETHANE JOINT SEALANTS

- A. Multicomponent, Non-sag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25 minimum, for Use NT.
 - 1. Products:
 - a. Sika; Master Seal NP 2.
 - b. Tremco Dymonic 100.
 - c. Sika Products; Sikaflex; 2c NS EZ Mix.
 - d. Pecora Corporation; Dynatrol II.
- B. Multicomponent, Non-sag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25 minimum, for Use T.
 - 1. Products:
 - a. Sika; Master Seal NP 2.
 - b. Tremco Dymonic 100.
 - c. Sika Products; Sikaflex; 2c NS EZ Mix.
 - d. Pecora Corporation; Dynatrol II.
- C. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade P, Class 25 minimum, for Use T.
 - 1. Products:
 - a. Sika; Master Seal SL 2.
 - b. Sika; Sikaflex; 2c SL.
 - c. Pecora Corporation; Dynatrol II SG.

2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolac.
 - b. May National Associates, Inc.; Bondaflex Sil-A 700.
 - c. Pecora Corporation; AC-20+.
 - d. Tremco Incorporated; Tremflex 834.

2.5 POLYUREA SEALANTS

- A. Polyurea Sealant: Semi-rigid, self-leveling, 2-part type. Shore D hardness of 85 when tested in accordance with ASTM D 2240. Tensile strength of 1160 pounds per square inch when tested in accordance with ASTM D 412.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Curecrete Distribution Company, Inc.; Ashford Crete-Fill.
 - b. L&M Construction Chemical, Inc. Joint Tite 750.
 - c. Adhesives Technologies Corp.; Crackbond JF311.

2.6 HYBRID SILICONE SEALANTS FOR RESINOUS WALL TREATMENTS

- A. Basis of Design: Subject to compliance with requirements, provide one of products listed below or a comparable product, with the following product characteristics, submitted to and accepted by Architect.
 - 1. Products:
 - a. Sika; MasterSeal NP 100.

2. Product Characteristics:
 - a. Classification: ASTM C920, Type S, Grade NS, Class 50, Use T.
 - b. Movement Capacity: +/- 50 percent.
 - c. Shore A Hardness: 17 to 23 per ASTM C 661.
 - d. Tensile Strength: 160-200 psi per ASTM D 412.
 - e. Tear Strength 22 lbs. per inch per ASTM 1004.
 - f. Color: As selected by Architect from manufacturer's full range of custom options.

2.7 POLYETHER SEALANTS

- A. Structural Adhesive/Sealant: ASTM C 920, Type S, Grade NS, Class 35, Use T, NT, M, A, G and O.
 1. Basis of Design: M-1 Structural Adhesive/Sealant as manufactured by Chem Link.
 2. Product Characteristics:
 - a. Tensile Properties (ASTM D-412) at 21 days: Tensile Stress: 370-psi minimum. Elongation at Break: 525%.
 - b. Shear Strength (ASTM D-1002): 390 psi.
 - c. Shore A Hardness (ASTM D-2240) at 21 days: 45.
 - d. Adhesion in Peel (TT-S-00230C, ASTM C 794).
 - e. Service Range: -40 degree to 200-degree F (-40 degree to 93 degree C).
- B. Siding - Window - Door - Roof Sealant: ASTM C 920, Type S, Grade NS, Class 35, Use T1, NT, M, A, G and O.
 1. Basis of Design: DuraLink 35 Sealant as manufactured by Chem Link.
 2. Product Characteristics:
 - a. Performance Requirements:
 - 1) Initial Cure (ASTM D-679): 45 minutes
 - b. Properties (ASTM D-412) at 21 days: Tensile Stress - 250-psi minimum. Elongation at Break - 750%. Modulus of 100%: 43 psi (0.30 MPa).
 - c. Shore A Hardness (ASTM D-2240) at 21 days: 20 +/-3
 - d. Service Range: -40 degree to 200-degree F (-40 degree to 93 degree C).
- C. Siding - Window - Door - Roof Sealant: ASTM C 920, Type S, Grade NS, Class 50, Use T1, NT, M, A, G and O.
 1. Basis of Design: DuraLink 50 Sealant as manufactured by Chem Link.
 - a. Product Characteristics:
 - 1) Performance Requirements:
 - (a) Initial Cure (ASTM D-679): 45 minutes
 - 2) Properties (ASTM D-412) at 21 days: Tensile Stress - 250-psi minimum. Elongation at Break - 750%. Modulus of 100%: 43 psi (0.30 MPa).
 - 3) Shore A Hardness (ASTM D-2240) at 21 days: 20 +/-3
 - 4) Service Range: -40 degree to 200-degree F (-40 degree to 93 degree C).

2.8 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings (079200.A04): ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape (079200.A05): 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: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean, porous joint substrate surfaces by brushing, grinding, 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.
 - 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.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
 - 4. As sealant work progresses, install tube weeps at 24 inches on center along base of metal wall panels and where indicated.
- D. 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.
- E. Tooling of Non-sag 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.
 - 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform one test for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
 - 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
 - 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

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

3.6 PROTECTION

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

3.7 JOINT-SEALANT SCHEDULE (079200.A01)

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - 2. Urethane Joint Sealant: Multicomponent, pourable/non-sag, traffic grade, Class 25.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints in formed metal wall panels.
 - d. Joints within and at perimeter of storefront and curtain wall assemblies.
 - e. Control and expansion joints.
 - f. Joints between different materials listed above.
 - g. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - h. Control and expansion joints in ceilings and other overhead surfaces.
 - 2. **Silicone Joint Sealant: Single component, non-staining, non-sag, neutral curing, Class 50.**
 - 3. **Polyether Joint Sealant: 100% solids one-component, gun grade, polyether-base material. The sealant shall cure under the influence of atmospheric moisture to form an elastomeric joint material.**
 - 4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Other joints as indicated, except for expansion and control joints.
 - 2. Urethane Joint Sealant: Multicomponent, non-sag, traffic grade, Class 25.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Expansion joints in tile and resinous flooring.
 - 2. Silicone Joint Sealant: Single component, non-sag, traffic grade, neutral curing, Class 100/50.
 - 3. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior control/contraction joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Control/contraction joints in concrete slabs indicated to receive sealed finish, polished concrete finish, resinous flooring and joints in slabs on grade extending to building exterior, seal watertight.
 - 2. Polyurea Joint Sealant: Polyurea, multi component, self-leveling, traffic grade.
 - 3. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.

- c. Vertical joints on exposed surfaces of interior unit masonry and concrete.
- 2. Joint Sealant: Urethane, multicomponent, non-sag, Class 25, paintable.
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint Sealant Application: Interior joints in vertical surfaces.
 - 1. Joint Locations:
 - a. Vertical joints in exposed surfaces of gypsum drywall partitions.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - 2. Joint Sealant: Acrylic based, paintable.
 - 3. Polyether Joint Sealant: 100% solids one-component, gun grade, polyether-base material. The sealant shall cure under the influence of atmospheric moisture to form an elastomeric joint material.
 - 4. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.
- H. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - 2. Joint Sealant: Single component, non-sag, mildew resistant, acid curing, Silicone.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- I. Joint-Sealant Application: Interior control/contraction joints in vertical surfaces (Resinous Wall treatments)
 - 1. Joint Locations:
 - a. Control and expansion joints in CMU, cement board, or gypsum board indicated to receive resinous wall treatment.
 - 2. Joint Sealant: Hybrid Silicone, single component, non-sag, Class 50, traffic grade.
 - 3. Joint Sealant Color: As selected by Architect from manufacturer's full range of custom colors.

END OF SECTION 079200

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SECTION 079500 - EXPANSION CONTROL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior wall expansion control systems.
 - 2. Interior expansion control systems.
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for alternates affecting the work of this Section.
 - 2. Section 079200 "Joint Sealants" for liquid-applied joint sealants and for elastomeric sealants without metal frames.

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 expansion joint cover assemblies.
- B. Shop Drawings: For each expansion control system specified. Include plans, elevations, sections, details, splices, attachments to other work, and line diagrams showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- C. Samples for Initial Selection: For each type of expansion control system indicated.
 - 1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.
- D. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - 1. Manufacturer and model number for each expansion control system.
 - 2. Expansion control system location cross-referenced to Drawings.
 - 3. Nominal joint width.
 - 4. Movement capability.
 - 5. Materials, colors, and finishes.
 - 6. Product options.
 - 7. Fire-resistance ratings.
- E. Samples for Initial Selection: For each type of exposed finish.
 - 1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric-seal material.
- F. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each fire barrier provided as part of an expansion control system, for tests performed by a qualified testing agency.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
 - 1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
 - 2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.
- B. Coordination: Coordinate installation of exterior wall expansion control systems with roof expansion control systems to ensure that wall transitions are watertight. Roof expansion joint assemblies are specified elsewhere.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Where indicated, provide expansion control systems with fire barriers identical to those of systems tested for fire resistance per UL 2079 or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Hose Stream Test: Wall-to-wall and wall-to-ceiling systems shall be subjected to hose stream testing.

2.3 EXTERIOR WALL EXPANSION CONTROL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide specified product or products by one of the following:
 - 1. Balco, Inc.
 - 2. Watson Bowman Acme Corp.; a BASF Construction Chemicals business.
 - 3. Comparable products from other manufacturers submitted to and accepted by Architect prior to bidding.
- B. Source Limitations: Obtain expansion control systems from single source from single manufacturer.
- C. Wall-to-Wall: Exterior Preformed Cellular Foam (079500.A20):
 - 1. Basis-of-Design Product: EMSEAL Corporation; "Colorseal".
 - 2. Design Criteria:
 - a. Nominal Joint Width: 1 to 2 inches, unless otherwise indicated.
 - b. Movement Capability: -25 percent/+25 percent.
 - c. Type of Movement: Thermal.
 - 3. Type: Preformed cellular foam with factory pre-coated face.
 - a. Foam Material: Manufacturer's standard.
 - 4. Face Seal Material: Manufacturer's standard, factory pre-coated.
 - a. Color: As selected by Architect from manufacturer's full range.
- D. Exterior Below Grade Waterproof Expansion Joint:
 - 1. Basis of Design: Subject to compliance with requirements, provide "RedLINE 100" by Situra or a comparable product with the following product characteristics by another manufacturer submitted to and accepted by Architect prior to bidding.
 - 2. Product Characteristics:
 - a. Thickness: 0.118 inches (3 mm)
 - b. Expansion Joint Gland Width: 4.75 inches.
 - c. Movement Range:
 - 1) Horizontal Movement (parallel to installation): 4 inches
 - 2) Vertical Movement (perpendicular to installation): 2 inches
 - 3) Shear Movement: 2 inches
 - d. Tear Resistance: 215 lbs./inch per ASTM D 624, Die C.
 - e. Puncture Resistance: 15 lbs. per CGSB 37.56 M96.
 - f. UV Exposure: No cracks or crazing after 5000 hrs. per ASTM G 53.

- E. Pre-Formed Cellular Foam Secondary Seals (079500.A23):
 - 1. Basis-of-Design Product: EMSEAL Corporation; "Backerseal".
- F. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Movement Capability: -25 percent/+25 percent.
 - c. Type of Movement: Thermal.
 - 2. Type: Preformed cellular foam.
 - a. Foam Material: Manufacturer's standard.
 - 3. Materials:
 - a. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.
 - 4. Accessories: Manufacturer's standard adhesives, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.4 INTERIOR EXPANSION CONTROL SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or a comparable product by one of the following:
 - 1. Balco, Inc.
 - 2. Construction Specialties, Inc.
 - 3. JointMaster/InPro Corporation.
 - 4. InPro Architectural Products.
 - 5. MM Systems Corporation.
 - 6. Nystrom, Inc.
 - 7. Watson Bowman Acme Corp.; a BASF Construction Chemicals business.
- B. Source Limitations: Obtain expansion control systems from single source from single manufacturer.
- C. Wall-to-Wall (079500.A06)
 - 1. Basis-of-Design Product: Balco, Inc.; Model WD-1.
 - 2. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Movement Capability: -50 percent/+50 percent, minimum.
 - c. Type of Movement: Thermal.
 - 3. Type: Flat Seal.
 - a. Metal Retainer: Aluminum.
 - 1) Finish: Manufacturer's standard.
 - b. Seal Material: Aluminum.
 - 1) Color: Clear Anodized finish.
- D. Wall to Corner (079500.A08)
 - 1. Basis-of-Design Product: Balco, Inc.; Model WDC-1.
 - 2. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Movement Capability: -25 percent/+25 percent, minimum.
 - c. Type of Movement: Thermal.
 - 3. Type: Flat Seal.
 - a. Metal Retainer: Aluminum.
 - 1) Finish: Manufacturer's standard.
 - b. Seal Material: Aluminum.
 - 1) Color: Clear Anodized finish.
- E. Preformed Cellular Foam (079500.A20):
 - 1. Basis-of-Design Product: EMSEAL Corporation; "Colorseal".
 - 2. Design Criteria:
 - a. Nominal Joint Width: 2 inches, unless otherwise indicated.
 - b. Movement Capability: -25 percent/+25 percent.
 - c. Type of Movement: Thermal.

3. Type: Preformed cellular foam with factory pre-coated face.
 - a. Foam Material: Manufacturer's standard.
 4. Face Seal Material: Manufacturer's standard, factory pre-coated.
 - a. Color: As selected by Architect from manufacturer's full range.
- F. Pre-Formed Cellular Foam Secondary Seals (079500.A23):
1. Basis-of-Design Product: EMSEAL Corporation; "Backerseal".
 2. Design Criteria:
 - a. Nominal Joint Width: 1 inch, unless otherwise indicated.
 - b. Movement Capability: -25 percent/+25 percent.
 - c. Type of Movement: Thermal.
 3. Type: Preformed cellular foam.
 - a. Foam Material: Manufacturer's standard.

2.5 MATERIALS

- A. Aluminum: ASTM B221, Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate.
 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.
- D. Accessories: Manufacturer's standard adhesives, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
 1. Install frames in continuous contact with adjacent surfaces.
 - a. Shimming is not permitted.
 2. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 3. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.

4. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 5. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
1. Provide in continuous lengths for straight sections.
 2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- E. Foam Seals: Install with adhesive recommended by manufacturer.
- F. Terminate exposed ends of expansion control systems with field- or factory-fabricated termination devices.

3.4 INSTALLATION OF BELOW GRADE WATERPROOF EXPANSION JOINTS

- A. Apply hot rubberized asphalt at manufacturer's recommended minimum thickness, immediately embed waterproof expansion joint to allow bottom polyester fleece to receive full contact with the hot rubberized asphalt.
- B. Do not install waterproof expansion joint in cold asphalt.
- C. Spread an even coat of hot rubberized asphalt on top surface of waterproof expansion joint to cover all polyester fleece surfaces. Embed a reinforcing fabric mesh overlapping the edge of the waterproof expansion joint and ensure full contact with the hot rubberized asphalt. Apply an additional coat of hot rubberized asphalt over top reinforcing fabric mesh at the manufacturer's minimum recommended thickness.
- D. Refer to Section 071413 for additional requirement regarding hot fluid applied water proofing installed adjacent to and over waterproof expansion joint systems.

3.5 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 079500

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SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes hollow-metal work.
 - 1. Interior heavy-duty hollow-metal door (081113.A01).
 - 2. Hollow-metal frame (081113.A31).
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for alternates effecting work of this Section.
 - 2. Section 042000 "Unit Masonry" for embedding anchors for hollow-metal work into masonry.
 - 3. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
 - 4. Section 099123 "Interior Painting" for field painting of hollow-metal work.
 - 5. Section 099600 "High Performance Coatings" for field painting of hollow metal work.
 - 6. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.
- B. High Wind Area Assemblies: High performance commercial steel door and frames assemblies designed, tested, and certified to meet extreme environmental application levels as follows:
 - 1. High Wind Area Applications: Door and frame assemblies that meet tornado shelter construction guidelines developed by the Federal Emergency Management Agency (FEMA) and meet the regulatory requirements specified.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Furnish a schedule of doors and frames using same reference numbers for details and openings as those on Drawings.
 - 2. Elevations of each door type.
 - 3. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 4. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 5. Locations of reinforcement and preparations for hardware.
 - 6. Details of each different wall opening condition.
 - 7. Details of anchorages, joints, field splices, and connections.

8. Details of accessories.
9. Details of moldings, removable stops, and glazing.
10. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 6 by 8 inches.

D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ceco Door Products; an Assa Abloy Group company.
 2. Curries Company; an Assa Abloy Group company.
 3. Republic Doors and Frames.
 4. Steelcraft; an Allegion company.
- B. Source Limitations:
1. Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2. For areas required to receive a fire rating greater than 45 minutes, fire testing shall be based on fire resistive criteria according to NFPA 251 or ASTM E119.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and 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 or UL 9.
1. For areas required to receive a fire rating of 45 minutes or greater, fire testing shall be based on fire resistive criteria according to NFPA 251 or ASTM E119.

2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.
1. Physical Performance: Level B according to SDI A250.4.
 2. Doors (081113.A01):
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch (18 gauge).
 - 1) Provide metallic-coated cold rolled steel in areas exposed to moisture and as indicated on Drawings.
 - d. Edge Construction: Model 1, Full Flush.
 - e. Core: Manufacturer's standard kraft-paper honeycomb for non-fire-rated doors and mineral-board for fire-rated doors.
 - f. Openings in door for vision lites shall be reinforced with manufacturer's recommended steel reinforcement channels at perimeter of vision lite opening.
 3. Frames (081113.A31):
 - a. Materials: Uncoated, steel sheet, minimum thickness of 0.067 inch (14 gauge).
 - 1) Provide metallic-coated cold rolled steel in areas exposed to moisture and as indicated on Drawings.
 - b. Side-lite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Face welded.
 - d. Reinforcement: Provide high frequency hinge reinforcement at top hinge location.
 4. Vision Lites:
 - a. For non-fire-rated glass, provide the following:
 - 1) Manufacturer's "flush" type vision lites.
 5. Exposed Finish: Prime.

2.4 EXTERIOR DOORS AND FRAMES

- A. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.
1. Physical Performance: Level B according to SDI A250.4.
 2. Doors (081113.A11):
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic coated, cold-rolled steel sheet, minimum thickness of 0.053 inch (16 gauge), with minimum A40 coating.
 - d. Edge Construction: Model 2, seamless.
 - e. Top of Door: Provide top of door with flush top cap.
 - f. Core: Polyurethane or Polyisocyanurate.
 - 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.5 when tested according to ASTM C 1363.
 - g. Openings in door for vision lites shall be reinforced with manufacturer's recommended steel reinforcement channels at perimeter of vision lite opening.
 3. Frames (081113.A31): Provide at all Level 2 hollow metal doors and wood doors.
 - a. Materials: Metallic coated steel sheet, minimum thickness of 0.053 inch (16 gauge), with minimum A40 coating.

- b. Construction: Face welded.
 - c. Reinforcement: Provide high frequency hinge reinforcement at top hinge location.
- 4. Exposed Finish: Prime.

2.5 BORROWED LITES

- A. Hollow-metal frames of uncoated steel sheet, minimum thickness of 0.053 inch (16 gauge).
- B. Construction: Face welded.

2.6 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. General: Anchors for severe storm-resistant door and frame assemblies shall be of sufficient length to provide not less than 5 inches of embedment into adjacent wall construction at jamb.
 - 2. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 3. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 - 4. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 - 5. Post-installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.7 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Section 088000 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 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 metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
 - 2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
 - 3. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
 - 4. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
 - 5. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
 - 6. Reinforcement at Vision Lites: Where fire-rated security glass is indicated for vision lites, provide steel channel reinforcement around inside perimeter of vision lite opening as standard by door manufacturer.
- C. Hollow-Metal Frames: 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.
 - 1. Side-lite 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.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 - 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - c. Compression Type: Not less than two anchors in each frame.
 - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
 - 6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
 - 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

3. Provide high frequency hinge reinforcement on top hinge only (two additional 10-gauge reinforcements are welded at 3 places each) on all door frames.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Vision lites shall be "flush" type, without through-bolts, except for vision lites associated with fire-rated security glass as specified in Article 2.8 below.
 5. Provide loose stops and moldings on inside of hollow-metal work.
 6. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.9 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.10 ACCESSORIES

- A. Louvers (081113.A35): Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. 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. 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.
- B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
- C. Provide high frequency hinge reinforcement on top hinge only (two additional 10-gauge reinforcements are welded at 3 places each) on all door frames.

- D. Reinforce doors and frames to receive continuous hinges where scheduled.

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 for doors, transoms, side-lites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - 1) Provide mortar guards for hinge and strike plate cutouts and any electrical components attached to frames.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing anti-freezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 5. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 6. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 - 7. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
 - c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
 - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Vision Lite Frames for Fire-Rated Security Glass: Install in strict accordance with vision lite manufacturer's written instructions to accommodate glass thicknesses indicated and to meet performance requirements indicated.

- E. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
 - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

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

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces (081416.A01).
 - a. Factory finishing flush wood doors.
- B. Related Requirements:
 - 1. Section 064023 "Interior Architectural Woodwork" for application of markerboard laminate and edge banding to wood doors.
 - 2. Section 081113 "Hollow Metal Doors and Frames" for hollow metal frames.
 - 3. Section 087100 "Door Hardware" for hardware in flush wood doors.
 - 4. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For
 - 1. Factory finished doors.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
 - a. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
 - 2. Louver blade and frame sections, 6 inches long, for each material and finish specified.
 - 3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Certificates: For door manufacturer as set forth in Quality Assurance article.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
 - 1. Do not deliver doors until building interior environmental conditions are maintained to meet Manufacturer's requirements for relative humidity.
- B. Package doors individually in plastic bags or cardboard cartons.
 - 1. Protect doors in place as necessary to prevent scratches, dents, and other damage.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.
- D. Do not place other items on top of stored doors.
- E. Do not drag doors across one another or across other surfaces.
- F. Handle doors using clean gloves.

1.7 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 temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

- A. Special Warranty: 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 face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements provide products by one of the following:
 - 1. Algoma / Graham / Marshfield / Mohawk / Masonite Architectural Doors.
 - 2. Eggers Industries.
 - 3. Oshkosh Door Company.
 - 4. VT Industries, Inc.
 - 5. Western Oregon Doors.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
 - 1. Provide labels indicating that doors comply with requirements of grades specified.
 - 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. WDMA I.S.1-A Performance Grade:
 - 1. Extra Heavy Duty.
- C. Particleboard-Core Doors:
 - 1. Particleboard: ANSI A208.1, Grade LD-2.
 - 2. Blocking: Provide wood blocking in particleboard-core doors as follows:
 - a. 5-inch top-rail blocking, in doors indicated to have closers.
 - b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - 3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- D. Heavy Duty Particleboard-Core Doors:
 - 1. PC-5 Bonded 5-ply Wood Based Particleboard Core Doors shall meet the WDMA Extra Heavy Duty Performance Level unless noted otherwise.
 - a. Provide with binder containing no urea-formaldehyde

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors (081416.A01 – **Type A1, E1**):
 - 1. Grade: Premium, with Grade A faces.
 - 2. Species:
 - a. Basis-of Design: VT Industries offering:
 - 1) Plain Sliced Red Oak
 - 3. Match between Veneer Leaves:
 - a. Book match.
 - 4. Assembly of Veneer Leaves on Door Faces: Running match.
 - 5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - 6. Exposed Vertical and Top Edges: Same species as faces - edge Type A.
 - a. Stile edges shall be 2-ply, not less than 1-3/8 inch thick. Outer hardwood edge ply shall be 5/8 inch thick. Inner ply shall be structural composite lumber or hardwood. Stile edges shall be continuous and shall not be finger jointed.
 - 7. Core: Particleboard or structural composite lumber.
 - 8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
 - a. MDF cross bands are not acceptable.
 - 9. Color:
 - a. Stains shall be custom-mixed to match Architect's sample and selections.

2.4 LIGHT FRAMES AND LOUVERS

- 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.
 - 1. Colors to be selected by Architect from full range of manufacturer's options.
 - 2. Fire Rated Doors: Products shall be listed and labeled for use in doors with fire protection rating required on doors schedule on Drawings.
- B. Metal Louvers:
 - 1. Blade Type: Vision-proof, inverted Y.

2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- 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.
 1. Fabricate door and transom panels with full-width, solid-lumber meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Factory cut and trim openings through doors.
 1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 3. Louvers: Factory install louvers in prepared openings.

2.6 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 two faces, two vertical edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
 - a. Where top edge is visible from an upper level (occupiable space) top edge shall be finished.
- B. Factory finish doors that are indicated to receive transparent finish.
 1. Transparent Finish:
 - a. General: Intent is to match Architect's control sample.
 - b. Grade: Premium.
 - c. Finish: Provide one of the following finishes:
 - 1) AWI's "Architectural Woodwork Standards" System 10, UV curable, water based polyurethane.
 - 2) WDMA TR-6 catalyzed polyurethane.
 - d. Staining: Custom, to match Architect's control sample.
 - e. Effect: Semi filled finish, produced by applying an additional finish coat to partially fill the wood pores.
 - f. Sheen: Satin.

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.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - a. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
- 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: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or 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 081416

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SECTION 083323 - OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Insulated service doors (083323.A02).
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.
 - 2. Division 26 sections for electrical raceway, boxes and wiring connections.

1.2 DEFINITIONS

- A. Severe Storm-Resistant Assemblies: High performance commercial steel door and frames assemblies and shutter assemblies designed, tested and certified to meet extreme environmental application levels as follows:
 - 1. Tornado Resistant Applications: Door and frame assemblies and shutter assemblies that meet tornado shelter construction guidelines developed by the Federal Emergency Management Agency (FEMA) and meet the regulatory requirements specified.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
 - 3. Include description of automatic closing device and testing and resetting instructions.
- 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, and 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. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
 - 5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
 - 6. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
 - 1. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Curtain slats and bottom bar.
 - 2. Include similar Samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Certifications for Tornado Resistant Door and Frame Assemblies and Shutter Assemblies: Submit written certification confirming FEMA door and frame assemblies comply with FEMA 361 and ICC 500-2008.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors 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 for both installation and maintenance of units required for this Project.
 - 1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.
- B. Fire & Smoke Rated Assemblies: Provide all doors with fire and smoke resistance rating required to comply with governing regulations which are inspected, tested, listed, and labeled by UL, WH or FM and complying with NFPA 80 for class of opening. Provide units tested in accordance with the requirements of UL 10B, UL 1784, NFPA 252, ASTM E-152. Provide testing laboratory label permanently fastened to each fire and smoke door assembly.
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.
- D. Tornado resistant assemblies shall comply with FEMA P-361 and ANSI ICC 500-2008 standards.
 - 1. Overhead coiling door assemblies must be furnished and installed as a system.
 - 2. Overhead coiling door assemblies shall be designed and tested to withstand windborne debris impact of a 15 pound missile traveling at 100 mph and a 250 mph design wind speed per FEMA for tornado resistant applications.

1.8 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instructions.

1.9 WARRANTY

- A. Warranty: Provide Two (2) Year Warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Manufacturers: Provide products meeting specified requirements from one of the following listed below. Refer to individual door types for "Basis-of-Design Products".
 - 1. Clopay Building Products.
 - 2. Cookson Company.
 - 3. Cornell Ironworks, Inc.

4. McKeon Rolling Steel Door Company, Inc.
 5. Overhead Door Corp.
 6. Raynor.
 7. Wayne-Dalton Corp.
- B. Source Limitations: Obtain each type of overhead coiling doors and shutters from single source from single manufacturer.
1. Obtain operators and controls from overhead coiling door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
1. Design Wind Load: As indicated on Drawings, but not less than a uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
 2. Testing: According to ASTM E 330.
 3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

2.3 INSULATED SERVICE DOOR ASSEMBLY (083323.A02)

- A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Basis of Design Product: Subject to compliance with requirements, provide Overhead Door Stormtite AP #627 Series or comparable product meeting specified requirements, by one of the manufacturers listed in Article 2.1, submitted to and accepted by Architect prior to bidding.
- B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283.
- D. Curtain R-Value: 10.9
- E. Door Curtain Material: 24 gauge Galvanized steel, insulated.
- F. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
1. Basis-of-Design: Overhead Door Corporation; FIT-265 Slat.
 2. Insulated-Slat Interior Facing: Metal.
 3. Insulation shall be foamed-in-place.
 4. Gasket Seal. Manufacturer's standard continuous gaskets between slats.
- G. Bottom Bar: Two powder coated black steel angles, each not less than 1/8 inch thick bolted back to back to reinforce curtain guides.
- H. Curtain Jamb Guides: Three Structural steel angles; Galvanized steel with painted exposed finish to match curtain slats to best extent possible.
- I. Hood: Match curtain material and finish.
1. Provide with internal hood baffle weatherseal.
 2. Shape: Round.
 3. Mounting: Face of wall.
- J. Electric Door Operator:
1. Usage Classification: Medium duty, up to 12 cycles per hour and up to 50 cycles per day.
 2. Operator Location: Top of hood.
 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
 4. Motor Exposure: Interior.
 5. Emergency Manual Operation: Chain type.
 6. Obstruction-Detection Device: Automatic photoelectric sensor and electric sensor edge on bottom bar.
 - a. Sensor Edge Bulb Color: As selected by Architect from manufacturer's full range.

- K. Curtain Accessories: Equip door with weatherseals and astragal.
- L. Door Finish:
 - 1. Factory Primed and Powder-Coated Finish: White
 - 2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 MATERIALS, GENERAL

- 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.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, unless otherwise specified, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
 - 1. Aluminum Door Curtain Slats: ASTM B 209 sheet or ASTM B 221 extrusions, alloy and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch; and as required.
 - 2. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required. Door curtains greater than 18 feet wide shall be 22 gauge minimum as determined by door manufacturer.
 - 3. Stainless-Steel Door Curtain Slats: ASTM A 666, Type 304; sheet thickness of 0.025 inch; and as required.
 - 4. Insulation: Fill slats for insulated doors with manufacturer's standard foamed-in-place thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
 - 5. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch and minimum aluminum thickness of 0.032 inch.
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.6 HOODS

- 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.
 - 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.
 - 2. Galvanized Steel: Nominal 0.028-inch-thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653/A 653M.
 - 3. Stainless Steel: 0.025-inch-thick stainless-steel sheet, Type 304, complying with ASTM A 666.
 - 4. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.7 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.

- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.8 CURTAIN ACCESSORIES

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
 - 1. At door head, use 1/8-inch-thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
 - 2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch-thick seals of flexible vinyl, rubber, or neoprene or nylon brushes.
- B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.
- C. Pole Hooks: Provide pole hooks and poles for doors more than 84 inches high.

2.9 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors 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 Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. 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.
 - 1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic closing device operates.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
 - 1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
 - 1. Electrical Characteristics:

- a. Phase: Single phase.
 - b. Volts: 115 V.
 - c. Hertz: 60.
 - 2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
 - 3. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 - 4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel. For fire-rated doors, activation delays closing.
- 1. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
 - a. Self-Monitoring Type: Four-wire configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.
- G. Control Station: Key-operated "On/Off" switch with three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
- 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
 - 2. Capable of operating all adjacent doors in succession.
 - 3. Location: Field verify location prior to Installation with Architect and Owner.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural 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.

2.12 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
- C. Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

2.13 STEEL AND GALVANIZED-STEEL FINISHES

- A. Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

2.14 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.

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. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Perform installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
 - 3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
 - 1. Adjust exterior doors and components to be weather-resistant.

- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 084113 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermal Broken Storefront Framing (4.5") (084113.A01).
 - 2. Thermal Broken Storefront Framing (6") (084113.A02).
 - 3. Non-Thermal Broken Storefront Framing (4.5") (084113.A06).
 - 4. Aluminum Door (Standard)(084113.A11).
 - 5. Aluminum Door (Heavy Duty) (084113.A12).
 - 6. FRP Door (084113.A14).
 - 7. Aluminum Subsills (084113.A21).
 - 8. Aluminum Closure Flashing (084113.A22).
 - 9. Aluminum Pan Flashing (084113.A23).
 - 10. Concealed Flashing (084113.A24).
 - 11. Jamb Closure Membrane (084113.A25).
 - 12. Aluminum Receptor (084113.A26).
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for alternates effecting work of this Section.
 - 2. Section 079200 "Joint Sealants" for installation of joint sealants installed in storefronts and entrance framing and for sealants not specified in this Section.
 - 3. Section 087100 "Door Hardware" for door hardware for aluminum doors.
 - 4. Section 088000 "Glazing" for glass within storefront and entrance systems.

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, installation instructions, material descriptions, dimensions of individual components and profiles, hardware, accessories and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Elevations shall be drawn at ½ inch scale.
 - 2. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 3. 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. Interface with adjoining building construction.
 - d. Expansion provisions.
 - e. Glazing.
 - f. Flashing and drainage.
 - 4. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 5. Shop Drawings shall be signed and sealed by a structural engineer licensed in the state where the project is located.
- 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.
 - 1. Architect reserves the right to require additional samples for verification purposes that show fabrication techniques and workmanship.
- 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. Detail fabrication and assembly of aluminum-framed systems.
 - 2. Include design calculations.
 - 3. Indicate design solutions for deflections of overhead structure as indicated on Structural Drawings.
 - 4. For aluminum-framed entrances and storefronts indicated to receive laminated (security) glazing systems, indicate design solutions recommended by laminated (security) glazing manufacturer to provide forced entry resistance level indicated in Section 088000 "Glazing".

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and field-testing agency.
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Preconstruction Test Reports: For sealant.
- E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
- F. Source quality-control reports.
- G. Field quality-control reports.
- H. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

- C. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- D. 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. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 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.
- E. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.
- F. Listings and Labels for Fire-Rated Framing: Fire rated framing and glazing shall be under current follow-up services by an approved independent agency and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.
- G. Source Limitations:
 - 1. For Aluminum-Framed Storefront Systems: Obtain from single source from single manufacturer.
 - 2. For Heavy-Duty Door Systems: Obtain from single source from single manufacturer.
 - 3. For Aluminum Sliding Door Systems: Obtain from single source from single manufacturer.

1.6 MOCKUPS

- A. Mockups/Field Samples: Build mockups/field samples, to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Mockups/Field Samples: Furnish and install quantity and size of aluminum windows indicated on Drawings within mockup constructed under Section 042000 "Unit Masonry." Mockup/Field Sample will be used set quality standards for materials and execution.
 - a. Install aluminum window to demonstrate surface preparation and installation of: jamb closure membrane, subsill, window framing, and application of perimeter window sealant and associated flashing.
 - b. Window shall include specified glazing where mockup is erected.
 - c. Maintain a 3/8 to 1/2 inch wide gap around entire perimeter of window to receive sealant.
 - d. Coordinate installation of window within mockups to permit inspection by Architect. Approved window installation will set quality standard of installation and aesthetic qualities of workmanship for project.
 - 2. Field Samples: Build field sample/mockup of typical wall areas as shown on Drawings.
 - a. Note: Mockup shall be a field sample of storefront, entrance and punched opening areas in Project. Architect and manufacturer's representative will observe installation of first 100 square feet of storefront installation and 100 square feet of entrance framing installation.
 - 3. Field testing shall be performed on field sample areas according to requirements in "Field Quality Control" Article.
 - 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/field sample areas may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver aluminum framing components in manufacturer's original protective packaging.
- B. Store aluminum components in a clean dry location away from uncured masonry and concrete. Cover components with waterproof paper, tarpaulin or polyethylene sheeting in a manner to permit circulation of air.
 - 1. Stack framing components in a manner that will prevent bending and avoid damage.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Check openings by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay in the work.
- B. Commencement of aluminum entrance and storefront work will be construed as Installer's acceptance of substrate surfaces and rough openings indicated to receive work of this Section.

1.9 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 - 2. Warranty Period: Two years from date of Substantial Completion.
 - 3. Warranty period for heavy-duty doors and associated frames shall be ten (10) 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: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "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. Other Design Loads: 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 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.
 - b. Refer to Structural Drawings for additional information regard structure and deflection criteria.
 - 3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
 - a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.
- 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 0.04 cfm/sq. ft. at a static-air-pressure differential of 6.24 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 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 10.0 lbf/sq. ft. for entrance/storefront framing.
 - 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. Heavy Duty Aluminum Storefront Doors and Frames:
 - 1. Swing Door Cycle Test: Test doors and frames according to ANSI A250.4 as follows:
 - a. Minimum 16,000,000 cycles.
 - 2. Cycle Slam Test Method: Test according to NWWDA T.M. 7-90 as follows:
 - a. Minimum 1,000,000 cycles.
- I. Interstory Drift: Accommodate design displacement of adjacent stories indicated.
 - 1. Design Displacement: As indicated on Drawings.
 - 2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.
- J. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
 - 2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.
- K. 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 0.40 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 0.40 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.
- L. 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. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
 - b. Low Exterior Ambient-Air Temperature: 0 deg F.
 - c. Interior Ambient-Air Temperature: 75 deg F.
- M. Structural-Sealant Joints:
1. Designed to carry gravity loads of glazing.
 2. Designed to produce tensile or shear stress of less than 20 psi.
- N. 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.
- O. Surface Burning Characteristics for FRP Face Sheets:
1. Interior Panels: All FRP face sheets located on the interior shall meet ASTM E 84, Class "A" requirements.
 2. Exterior Panels: All FRP face sheets located on the exterior shall meet ASTM E 84, Class "C" requirements.

2.2 MANUFACTURERS AND PRODUCTS

- A. Basis-of-Design Criteria: Drawings indicate sizes, profiles, and dimensional requirements for storefront, entrance and window framing systems required, that are based on specific types, models and performance criteria indicated. Systems from other manufacturers may be considered, provided deviations in dimensions, profiles and performance are minor and do not change the design concept as judged by the Architect. Burden of proof is on the proposer.
- B. Basis-of-Design Products for Storefront Framing Systems: Subject to compliance with requirements, provide or one of the systems listed below or comparable product submitted to and accepted by Architect prior to bidding.
1. Thermally Broken Storefront and Entrance Framing (084113.A01 – Center Plane Glazed):
 - a. Basis of Design: Kawneer North America; Trifab VG 451T.
 - b. EFCO Corporation; S 403.
 - c. Manko Windows and Doors; 2450 Series.
 - d. Tubelite; 14000.
 2. Thermally Broken Storefront and Entrance Framing (084113.A02 – Center Plane Glazed):
 - a. Basis-of-Design: Kawneer North America; Trifab 601T.
 - b. EFCO Corporation; Series 406.
 - c. Manko; Series 2650.
 - d. Tubelite; T24650 Series.
 3. Non-thermal Storefront and Entrance Framing (084113.A06 – Center Plane Glazed):
 - a. Basis-of-Design: Kawneer North America; Trifab VG 451.
 - b. EFCO Corporation; Series 402 NT.
 - c. Manko Windows and Doors; 450 Series.
 - d. Tubelite; 14000 Series (non-thermal).
 4. Interior standard-duty manual-swing doors (084113.A11 - E9):
 - a. Basis-of-Design: Kawneer North America; Series 500 Wide Stile.
 - 1) EFCO Corporation; D-500.
 - 2) Manko Windows and Doors; 150 Series.
 - 3) Tubelite; Comparable product.

5. Heavy-Duty (Stile and Rail Construction) Manual-Swing Doors and Associated Frames (084113.A12 - **E10**):
 - a. Basis-of-Design: Special-Lite, Inc. No substitutions allowed.
 - 1) Exterior heavy-duty manual-swing entrance doors: Model "SL-15" (wide stile).
 - 2) Interior heavy-duty manual-swing vestibule doors: Model "SL-15" (wide stile).
 6. Heavy-Duty (FRP Clad Construction) Manual-Swing Doors and Associated Frames (084113.A14 - **A8**):
 - a. Exterior heavy-duty FRP manual-swing doors:
 - 1) Basis of Design: "SL-17" by Special-Lite, Inc; Texture as selected from manufactures full range.
- C. 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:
 - a. Thermally broken
 - b. Non-Thermal
 2. Glazing System:
 - a. Retained mechanically with gaskets on four sides.
 3. Glazing Plane:
 - a. Exterior Locations:Center plane glazed.
 - b. Interior Locations:Center plane glazed.
 4. Finish:
 - a. Type: Exterior Frames: Color anodized finish- Dark Bronze. Intent is to match existing.
 - b. Type Interior Frames: Clear anodized finish, unless otherwise noted on the drawings.
 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. Pressure Caps: Manufacturer's standard snap-on aluminum caps that mechanically retain glazing.
 1. Provide extended caps where indicated.
 2. At 90 degree outside corners, provide pre-manufactured mullion cap/trim as single unit to cover both sides where shown.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. 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.
 3. Pultruded Fiberglass: Manufacturer's standard.

2.4 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
 1. General:

- a. Thermal Construction: Manufacturer's standard elastomeric type.
 - b. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - 1) Provide nonremovable glazing stops on outside of door.
 - 2. Standard Duty – Manual Swing Doors (084113.A11): 1-3/4 inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Doors shall have 4-1/2- to 5-inch wide stiles, 6-1/2 inch top rail, 8 inch intermediate rail and 10 inch bottom rail.
 - 3. Heavy Duty - Stile and Rail Door Construction (084113.A12): 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Corners shall be mortised and tenon construction, reinforced with 3/8-inch diameter galvanized steel concealed tie rods. Glass stops shall be integral with stile and rail extrusions on one side
 - a. Exterior heavy-duty manual-swing entrance doors: Doors shall have 4-3/4-inch-wide stiles, 6-1/2-inch top rail, 12-inch intermediate rail and 10 inch bottom rail.
 - b. Interior heavy-duty manual-swing vestibule doors: Doors shall have 4-3/4-inch-wide stiles, 6-1/2-inch top rail, 12-inch intermediate rail and 10 inch bottom rail.
 - 4. Heavy Duty - FRP Clad Door Construction (084113.A14): 1-3/4-to 1-7/8-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Corners shall be mitered or mortise and tenon, reinforced with angle blocks and 3/8-inch diameter full-width galvanized steel tie rods. FRP face sheets shall be rabbeted and secured on all four sides by full-length integral reglets on edges of the stiles and rails.
 - a. Exterior heavy-duty FRP manual-swing doors (Type A8): Face sheets shall be pebble-textured, 0.120 inch thick FRP in color selected by Architect. Core shall be poured-in-place polyurethane foam, 5 pcf density achieving a minimum R-value of 9.
- B. Entrance Door Framing and Subframing:
- 1. Door Framing (Heavy Duty Doors):
 - a. For 4-1/2 inch framing – Basis of Design: Special-Lite, Inc.; "SL-245FG", compatible with storefront framing system.
 - b. For 4-1/2 inch framing – Basis of Design: Special-Lite, Inc.; "SL-245TB", compatible with exterior storefront framing system.
 - c. For 6 inch framing - Basis of Design: Special-Lite, Inc.; "SL-260FG", compatible with storefront framing system.
 - d. For 6 inch framing - Basis of Design: Special-Lite, Inc.; "SL-260TB", compatible with storefront framing system.
 - e. At the request of the Owner, substitutions for this product are not allowed.
 - 2. Door Subframing: Manufacturer's standard, not greater than 1-inch face dimension for use at entrances within curtain wall. Finish to match adjacent curtain wall framing.

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
 - 1. Hardware for heavy-duty aluminum doors shall be installed at the door manufacturer's factory and be included in the warranty.
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule, Section 087100 "Door Hardware", and as specified hereinafter.
 - 1. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 - 2. Opening Force Requirements:
 - a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to 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. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
 - E. Weather Stripping: Manufacturer's standard replaceable components. "Fin" type stops and vinyl weatherstripping are not acceptable.
 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
 - F. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
 - G. Silencers: BHMA A156.16, Grade 1.
 - H. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.
 - I. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
 1. Sealant shall have a VOC content of 250 g/L or less.
 2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Structural Glazing Sealants: 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.
- E. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with other system components with which it comes in contact; recommended by weatherseal-sealant and glazed storefront manufacturers for this use.
 1. Color: As selected by Architect from manufacturer's full range of colors.
 2. Color: Match structural sealant.
- F. Security Glazing: Provide a minimum edge engagement of 5/8" to augment performance.

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. Exposed Fasteners: Do not use exposed fasteners except for application of hardware. For application of exposed hardware, use exposed fasteners with countersunk Phillips screw heads or flat-head machine screws, fabricated from 300 series stainless steel.

- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Aluminum Subsills (084113.A21): Provide high performance subsill that incorporates a watertight interior back leg with end dams and integral water collection trough that weeps to exterior. Subsill shall be of profile and dimensions required for installation indicated. Finish subsill to match adjacent aluminum framing. Seal all penetrations through subsills to be watertight.
 - 1. Provide high performance subsills at all storefront, entrance and window framing, unless specifically indicated otherwise.
- D. Aluminum Closure Flashing (084113. A22): Provide prefinished aluminum, not less than 0.090 inch thick, of alloy and type selected by manufacturer for compatibility with other components. Fabricate closure flashing to configurations indicated. Finish to match adjacent storefront, entrance and window framing. Seal closure flashing to be watertight.
- E. Aluminum Pan Flashing (084113.A23): Provide prefinished aluminum, not less than 0.090 inch thick, of alloy and type selected by manufacturer for compatibility with other components. Fabricate pan flashing to configurations indicated to direct water to exterior away from storefront and window framing. Finish to match adjacent storefront and window framing.
- F. Aluminum Jamb Extensions: prefinished aluminum of finish, size, profile and material to match framing system. Anchor to framing member. Extension depth as indicated on drawings.
- G. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- H. Jamb Closure Membrane (084113.A25):
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following products:
 - a. "CCW-705-TWF"; as manufactured by Carlisle Coatings and Waterproofing.
 - b. "Perm-A-Barrier Wall Flashing"; as manufactured by Grace Construction Products.
 - c. "Air-Shield"; as manufactured by W. R. Meadows, Inc.
 - d. "Blueskin"; as manufactured by Henry Corp.
 - 2. Product Characteristics:
 - a. Self-adhering, membrane, 40 mils thick.
 - b. Flashing shall function as an air, vapor and water barrier.
 - c. Flashing shall be compatible with air barrier coating specified in Section 072729.
- I. Aluminum Receptor (084113.A26): Provide manufacturer's high performance head compensating receptor as required. Provide prefinished aluminum, of alloy and type selected by manufacturer for compatibility with other components. Finish to match adjacent storefront, entrance and window framing. Seal all penetrations through head to be watertight.
 - 1. Provide high performance head compensating receptor as indicated on the drawings.
- J. 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 interior.
 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. Storefront Framing: Fabricate components for assembly using shear-block system, or screw-spline system, or head-and-sill-receptor system with shear blocks at intermediate horizontal members.
- G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
1. At exterior door frames, provide compression weather stripping at fixed stops.
 2. At interior door frames, 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.
 3. Fin-type door stops are not acceptable.
- H. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. Heavy Duty – Stile and Rail Construction (084113.A12): Aluminum standard doors shall be fabricated as previously specified.
 2. Heavy Duty – FRP Clad Construction (084113.A14): Aluminum heavy-duty doors with FRP face sheets shall have mitered corners and full-width 3/8-inch diameter galvanized steel tie rods secured with locking hex nuts.
 3. Reinforce doors as required for installing entrance door hardware.
 4. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 5. At exterior doors, provide weather sweeps applied to door bottoms.
- I. 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.
- J. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
1. Color: As noted on drawings.
 - a. Dark Bronze, Intent is to Match Existing at Exterior frames. Verify with Architect.

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 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 non-movement 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.
 - 7. Completely fill gaps between shims and adjacent construction with loose fiberglass insulation or spray foam insulation.
 - 8. At fire-rated openings, install frames according to NFPA 80.
 - 9. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 10. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- B. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
 - 1. Install two-piece snap trim with long leg oriented horizontally and short leg fastened to aluminum framing, so that trim cover is exposed, and trim clip is concealed. Secure trim to aluminum framing and adjacent construction in accordance with trim manufacturer's written instructions.
- E. Prior to installation of perimeter vertical members, install jamb closure membrane at cavity walls to cover gap/joint between interior and exterior substrates. Intent is to seal air cavity and joints between substrates. Extend membrane from interior face of framing/blocking to exterior. Trim membrane so that it will not be exposed to view after vertical members are set, and edge of membrane is terminated in sealant installed around perimeter of aluminum framing.
 - 1. Seal tops of end dams at jambs to adjacent construction or extend jamb closure membrane over end dam to direct water into subsill in order to drain to exterior.
- F. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- G. Install glazing as specified in Section 088000 "Glazing."
- H. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.
- I. 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: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform tests in each test area as directed by Architect.
 - 1) For punched openings, test 25 percent of installation, in each type of exterior finish substrate, unless noted otherwise.
 - 2) For storefront, and clerestories; test each installation, unless noted otherwise.
- 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 four areas on each building facade.
 - 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.

END OF SECTION 084113

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SECTION 085613 - TRANSACTION WINDOWS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Security Window (085613.A03).
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for transaction window lock coordination.
 - 2. Section 088000 "Glazing" for laminated glass requirements for sliding window.

1.2 COORDINATION

- A. Coordinate installation of anchorages for windows. 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 adjacent construction. Deliver such items to Project site in time for installation.

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 for window units.
- B. Required Sustainable Design Submittals:
 - 1. Product Data: For sealants, indicating VOC content.
 - 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - 3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 4. Product Certificates: For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
 - 5. Environmental Product Declaration: For products which the Manufacturer has made product-specific declaration involving EPDs or another USGBC-approved program for environmental product declarations.
 - 6. Health Product Declaration: For product which the Manufacturer has made a product-specific declaration involving HPDs or another USGBC-approved program for material ingredient reporting.
 - 7. Material Optimization: For products which the Manufacturer has made product-specific declarations involving GreenScreen v1.2, Cradle to Cradle, REACH, or another USGBC-approved program for building product optimization.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachments to other work.
 - 2. Full-size section details of framing members, including internal armoring, reinforcement, and stiffeners.
 - 3. Details of shelf.
 - 4. Hardware for sliding window units.
 - 5. Glazing details.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Framing: 12-inch-long sections of frame members.
 - 2. Glazing: 6-inch square sample.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Examination reports documenting inspections of substrates, areas, and conditions.
- C. Sample Warranty: For special warranty.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Pack windows in wood crates for shipment. Crate glazing separate from frames unless factory glazed.
- B. Label window packaging with drawing designation.
- C. Store crated security windows on raised blocks to prevent moisture damage.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including deflections exceeding 1/4 inch.
 - b. Failure of welds.
 - c. Excessive air leakage.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 SECURITY TICKET WINDOWS (085613.A03)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Amortex "Maximum Security Transaction Ticket Window".; Model # WI-TW-AL-SP
- B. Product Characteristics and Features:
 - 1. Configuration: One fixed-glazed panel with speak-thru opening and a pass-thru opening in aluminum frame.
 - a. Unit size: 30" (W) X 36" (H)
 - b. Frame:
 - 1) Jamb Depth: 6 inches
 - 2) Frame thickness: 1-1/2 inches
 - 3) Finish: Clear Anodized Aluminum
 - 4) Bullet Resistance: Level 3
 - c. Glazing: Level 3 Bullet Resistant Polycarbonate (by Others)
 - 2. Accessories:

- a. Speak-Thru Speaker: Basis-of-Design to be Armortex, "Speaker SSS-7"; Model:SP-SS-PV-CB securely set into glass vision panel.
 - 1) Size: 7 inch face plates to fit 4 inch diameter hole
 - 2) Material: Stainless Steel
 - 3) Finish: #3 Satin Brushed
 - 4) Ballistic resistance: Level 3
- b. Deal Tray: Basis-of-Design to be Armortex, "Deal Tray Stainless Steel RMDT-1012 with B.E"; Mode:TE-DT-BE-12
 - 1) Size: 10 inch x 12 inch x 1-1/2" deep
 - 2) Material: 16 Gauge Stainless Steel
 - 3) Finish: #3 Satin Brushed
 - 4) Ballistic resistance Line with HI-Hard ballistic steel as required to meet Level 3 Ballistic requirements.

2.2 FABRICATION

- A. General: Fabricate windows to provide a complete system for assembly of components and anchorage of window units.
 - 1. Provide units that are preglazed at the factory.
 - 2. Provide units that are reglazable from the secure side without dismantling the non-secure side of framing.
 - 3. Prepare teller windows for field glazing.
- B. Framing: Miter or cope corners the full depth of framing; weld and dress smooth.
- C. Glazing Stops: Finish glazing stops to match teller window framing.
 - 1. Non-Secure-Side (Exterior) Glazing Stops: Welded or integral to framing.
 - 2. Secure-Side (Interior) Glazing Stops: Removable, coordinated with glazing indicated.
- D. Welding: Weld components to comply with referenced AWS standard. To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- E. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- F. Weather Stripping: Factory applied.

2.3 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Protect mechanical 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 adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.4 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.5 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

2.6 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- B. Cast-in-Place Anchors in Concrete: Fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified testing agency; of type indicated below.
 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 27/A 27M cast steel or ASTM A 47/A 47M malleable iron. Provide bolts, washers, and shims as required; hot-dip galvanized according to ASTM A 153/A 153M or ASTM F 2329/F 2329M.
- C. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16 inch thick; with minimum 1/2-inch-diameter, headed studs welded to back of plate.
- D. Glazing Strips and Weather Stripping: Manufacturer's standard replaceable components.
 1. Compression Type: Molded EPDM or neoprene gaskets complying with ASTM D 2000, Designations 2BC415 to 3BC620; molded PVC gaskets complying with ASTM D 2287; or molded, expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.
 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric backing.
- E. Miscellaneous Glazing Materials: Provide material, size, and shape complying with requirements of glass manufacturers and with a proven record of compatibility with surfaces contacted in installation.
 1. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
 2. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
 3. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
 4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B 633; provide sufficient strength to withstand design pressures indicated.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- H. Sealants: For sealants required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.

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 security windows.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of security window connections before security window installation.
- C. Inspect built-in and cast-in anchor installations, before installing security windows, to verify that anchor installations comply with requirements. Prepare inspection reports.
 1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
 2. Perform additional inspections to determine compliance of replaced or additional work. Prepare anchor inspection reports.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other security window anchors whose installation is specified in other Sections.
 - 1. Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.

3.3 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing security windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
- B. Glazed Framing: Provide sealant-glazed framing. Comply with installation requirements in Section 088000 "Glazing."
- C. Removable Glazing Stops and Trim: Fasten components with security fasteners.
- D. Fasteners: Install security windows using fasteners recommended by manufacturer with head style appropriate for installation requirements, strength, and finish of adjacent materials. Provide stainless-steel fasteners in stainless-steel materials.
- E. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.
 - 1. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction unless otherwise indicated.
 - 2. Seal frame perimeter with sealant to provide weathertight construction unless otherwise indicated.
- F. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.4 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

3.5 ADJUSTING

- A. Remove and replace defective work, including teller windows that are warped, bowed, or otherwise unacceptable.

3.6 CLEANING AND PROTECTION

- A. Clean surfaces promptly after installation of windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
- B. As applicable, clean glass of preglazed security windows promptly after installation. Comply with requirements in Section 088000 "Glazing" for cleaning and maintenance.
- C. Provide temporary protection to ensure that windows are without damage at time of Substantial Completion.

END OF SECTION 085613 085613

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Intent: The intent of this Section is to provide finish hardware for the proper operation and control of all wood, hollow metal and aluminum doors in the Project. Prior to bidding, notify the Architect of any doors that do not have hardware meeting this intention.
- B. This Section includes items known commercially as finish or door hardware that are required for swinging doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed. This Section includes, but is not necessarily limited to furnishing and installing complete, the following:
 - 1. Finish hardware for proper operation and control of all wood, aluminum and hollow metal doors, including hinges, locks and latch sets, closers, panic devices, auto-flushbolts, electric strikes, magnetic holders, removable mullions, cylinders, keys, miscellaneous stops, flat goods, weatherstripping and thresholds as required.
 - 2. Cylinder for access doors where specified.
- C. Related work in other sections:
 - 1. Hollow metal doors, frames and silencers: Section 081113.
 - 2. Wood doors: Section 081416.
 - 3. Aluminum doors: Section 084113.

1.2 DEFINITIONS

- A. "Finish Hardware" includes items known commercially as finish hardware which are required for swing, and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit manufacturers technical product data for each hardware item. Include information necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finishes.
 - 1. Manufacturer shall submit written certification confirming closers compliance with U.L. 10C.
- B. Hardware Schedule: Submit a hardware schedule in a vertical format (horizontal format not acceptable), organized into sets, including the information below. Designations for door numbers and hardware sets in the schedule shall match those used in the Construction Documents for each opening.
 - 1. Hardware Schedule shall be coordinated with doors, frames, and related work to ensure proper size, thickness, hand function, and finish of door hardware.
 - 2. Catalog cuts of each type of exposed hardware unit, highlighted in color to indicate compliance with the Hardware Schedule.
 - 3. Type, style, function, size and finish of each hardware item.
 - 4. Name and manufacturer of each item.
 - 5. Fastenings and other pertinent information.
 - 6. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
 - 7. Mounting locations for hardware.
 - 8. Door and frame sizes and materials.
 - 9. Deviations from Specifications shall be noted in cover letter.
- C. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.
- D. Keying Schedule: Submit separate detailed schedule, at the same time as the Hardware Schedule, indicating keying for all locks and how Owner's instructions, on keying of locks has been fulfilled. Keying schedule must be approved before ordering any locks.

- E. Pinning Transcript: Submit detailed schedule indicating each lock cylinder and core.
- F. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
- B. Product/Material Qualifications: Manufacturer's product numbers are indicated for convenience in identifying finish hardware items. Unless otherwise indicated, manufacturer's description for indicated product number constitutes minimum standards of quality, design, function and performance required for each item to be incorporated into the Project.
 - 1. It will be the responsibility of the Bidder to furnish with his Bid a list clarifying any deviations from these specifications written or implied, in order that a fair and proper evaluation be made. Those Bidders not submitting a list of deviations will be presumed to have Bid as specified.
- C. Supplier Qualifications: A recognized Architectural Finish Hardware Supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years. Supplier shall be or employ an experienced Architectural Hardware Consultant (AHC) who is certified by and member of the Door and Hardware Institute. The Architectural Hardware Consultant shall be available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.
 - 1. Supplier shall meet with the Owner to finalize keying requirements and obtain final instructions in writing.
- D. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Pamphlets No. 80, No. 101 and of authorities having jurisdiction requirements. Provide only hardware which has been tested and listed by UL, FM or Warnock Hersey for types and sizes of doors required and complies with requirements of door and door frame labels.
 - 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware".
- E. Standards: Comply with the requirements of the latest edition of the following standards, unless indicated otherwise:
 - 1. American National Standards Institute (ANSI) Publications:
 - a. A115 Series - Door and Frame Preparation.
 - b. A156 Series - Hardware.
 - 2. Builders Hardware Manufacturers Association (BHMA) Publications:
 - a. 1201 - Auxiliary Hardware.
 - b. 1301 - Materials and Finishes.
 - 3. Door and Hardware Institute (DHI) Publications:
 - a. Keying - Procedures, Systems, and Nomenclature.
 - b. Abbreviations and Symbols.
 - c. Hardware for Labeled Fire Doors.
 - d. Recommended Locations for Builder's Hardware for Standard and Custom Steel Doors and Frames.
 - e. Wood Door Standards W1, W2, WDHS-2, WDHS-3.
 - 4. National Fire Protection Association (NFPA) Publications:
 - a. NFPA Pamphlet No. 80 - Standards for Fire Doors and Windows.
 - 5. International Building Code - current edition adopted.
 - 6. Americans with Disabilities Act (ADA).
- F. Keying Conference: Conduct conference in accordance with Section 013100. In addition to Owner, Construction Manager, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2. Preliminary key system schematic diagram.
 - 3. Requirements for key control system.
 - 4. Address for delivery of keys.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Section 013100 as follows:

1. Architectural Finish Hardware supplier (AFHS) shall conduct the preinstallation conference at the site. The AFHS shall instruct finish hardware installer on proper installation, adjustment and troubleshooting for each operable item of finish hardware specified. The AFHS shall observe the installation and adjustment of the first three locksets, closers and exit devices.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Package each hardware item in separate containers with all screws, wrenches, installation instructions and installation templates. Mark or tag each box with hardware heading and door number according to approved hardware schedule.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation. Provide a complete packing list showing items, door numbers and hardware headings with each shipment.
- D. Store hardware in shipping cartons above ground and under cover to prevent damage.
 1. Provide secure lockup for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.
- E. Aluminum Door Hardware: If required by door manufacturer deliver hardware for aluminum doors as directed by the door supplier for factory installation.

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 door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system, as applicable.
- C. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.
 1. Fire ratings of existing doors and frames are to be maintained, provide hardware accordingly.

1.7 MAINTENANCE

- 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 HARDWARE - GENERAL

- A. Provide the materials or products indicated by trade names, manufacturer's name, or catalog number.
- B. Provide manufacturer's standard products meeting the design intent of this Specifications, free of imperfections affecting appearance or serviceability.
 1. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.
 2. Provide hardware complete with all fasteners, anchors, instructions, layout templates, and any specialized tools as required for satisfactory installation and adjustment.
 3. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

4. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated or approved. Finish screws exposed under any condition to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as
 5. Finish all other hardware in accordance with the BHMA finish as follows, unless otherwise indicated in manufacturers screws to secure hardware.
 6. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where indicated otherwise or where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex bolt fasteners.
 7. Provide factory pinned cylinders and cores.
- C. Hardware is specified in the hardware schedule by set, type, and functions which have been selected as best meeting the application requirements. Acceptable products for each category are specified under PART 2 of this Specification.

2.2 SPECIAL REQUIREMENTS

- A. Hinges:
1. Provide non-removable pins for all exterior doors and out-swinging corridor doors. Use nonrising pins for all other doors.
 2. Pre-drill pilot holes for hinge fasteners at factory to suit hinge type.
 3. Provide continuous hinges where specified.
- B. Locksets:
1. All locksets shall meet or exceed ANSI A156.13-94, Grade 1 requirements.
 2. Locksets shall accept Best small format interchangeable cores.
- C. Panic Devices:
1. Panic devices shall have touchbars made of stainless steel, provide devices in stainless finish where specified.
 2. Latchbolts are to be deadlatching.
 3. Exit devices are to incorporate a flush and tapered endcap.
 4. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.
 5. Classrooms and student spaces with panics are to have the ability to lock from the inside via a key or thumbturn. Lock condition must be readily distinguishable from the classroom side via indicator on the panic.
 6. Provide UL labeled fire exit hardware for fire rated openings.
 7. Provide electrified options as scheduled in the hardware sets.
- D. Closers:
1. Comply with manufacturer's recommendations for unit size based on door size, weather exposure and usage.
 2. All surface closers shall exceed ANSI A156.4 Grade 1 requirements in all aspects as called for below. All closers shall have certification by an independent testing laboratory of 10,000,000 cycles without failure. Provide special rust inhibitive primer (SRI) where specified.
 3. Furnish all brackets, drop plates and any other necessary hardware required to insure proper installation.
- E. Thresholds and Gasketing
1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
 2. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
 3. Gasketing and astragals on aluminum frames by door manufacturer.
- F. Silencers
1. Provide "push-in" type silencers for hollow metal or wood frames.
 2. Provide one silencer per 30 inches of height on each single frame, and two for each pair frame.
 3. Omit where gasketing is specified.

2.3 KEYING

- A. All cylinders to be keyed to the districts existing Best master system. Verify proper key system. Keying schedule must be approved by the Owner prior to ordering locks.
 - 1. Hardware supplier shall be responsible for providing the correct type of cylinder for each hardware application, and supplying cylinder with correct tailpiece and/or cam.
 - 2. Provide removable cores where specified.
- B. Key all locks separately, or alike, as directed by the Owner's representative and Architect.
- C. Provide keys as follows:
 - 1. Change Keys: Two (2) per lock.
 - 2. Master Keys: Six (6) required (per system).
- D. Identification: Stamp all (master-type) keys with the following:
 - 1. Do Not Duplicate.
 - 2. Key change number (all keys).

2.4 HARDWARE FINISHES

- A. Provide matching finishes for hardware units at each door to the greatest extent possible, unless otherwise indicated. In general, match items to the finish for the latch, lock or push-pull unit for color and texture.
 - a. Product description or schedule:
 - 1) 626 satin chrome-plated.
 - 2) 630 satin stainless steel.

2.5 HARDWARE PRODUCTS

- A. Hinges:
 - 1. Specified manufacturer: IVES Hardware; an Allegion Company.
 - 2. Acceptable substitutions:
 - a. Hager Companies.
 - b. McKinney Products Company; an ASSA ABLOY Group company.
 - c. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Continuous Gear-Type Hinges:
 - 1. Specified manufacturer: IVES Hardware; an Allegion Company.
 - 2. Acceptable substitutions:
 - a. Hager Companies.
 - b. McKinney Products Company; an ASSA ABLOY Group company.
 - c. Select Products Limited.
- C. Locksets:
 - 1. Specified manufacturer: Schlage Lock; an Allegion Company.
 - 2. Substitutions: Best Lock; a Dorma/Best Company.
- D. Exit Devices:
 - 1. Specified manufacturer: Von Duprin; an Allegion Company
 - 2. Substitutions: Not allowed. Products to match District standard.
- E. Closers:
 - 1. Specified manufacturer: LCN Closers; an Allegion Company.
 - 2. Substitutions: Not allowed. Products to match District standard.
- F. Flatgoods:
 - 1. Specified manufacturer: Ives Hardware; an Allegion Company.
 - 2. Acceptable substitutions:
 - a. Burns.
 - b. Rockwood.
- G. Stops:
 - 1. Specified manufacturer: Ives Hardware; an Allegion Company.
 - 2. Acceptable substitutions:
 - a. Burns Manufacturing Incorporated.
 - b. Hager Companies.
 - c. Rockwood Manufacturing Company.
 - d. Trimco

- H. Overhead stops:
 - 1. Specified manufacturer: Glynn-Johnson; an Allegion Company.
 - 2. Acceptable substitutions:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Door Controls International.
 - c. Ives Hardware; an Allegion Company.
 - d. Rixson Specialty Door Controls; an ASSA ABLOY Group.
 - e. Trimco.
- I. Thresholds:
 - 1. Specified manufacturer: Zero International
 - 2. Acceptable substitutions:
 - a. Pemko Manufacturing Co.
 - b. Reese Enterprises.
 - c. National Guard Products.
- J. Door Gasketing/Weatherstripping:
 - 1. Specified manufacturer: Zero International
 - 2. Acceptable substitutions:
 - a. Pemko Manufacturing Co.
 - b. Reese Enterprises.
 - c. National Guard Products.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Carefully inspect doors, frames, and conditions under which hardware will be installed. Notify the Architect of any conditions that would adversely affect the installation or subsequent door operations. Do not proceed until unsatisfactory conditions are corrected.
 - 1. Frames shall be verified, inspected, and confirmed by General Contractor as being plumb and true.
- B. Refer to Sections 081113, 081416, and 084113 for additional installation requirements.
- C. Prior to hardware installation, the Hardware Supplier shall meet with the Owner's Representative, Architect, and Hardware Installer to ensure the Installer has and understands the manufacturers' installation requirements for all hardware items.
 - 1. The Supplier shall observe the installation of the first lockset, closer and panic device.

3.2 INSTALLATION

- A. Mount Hardware units at heights indicated in respective DHI Standards, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.
- B. Install each hardware item in compliance with the manufacturer's instructions and written recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be field finished, coordinate removal, storage and reinstallation or application of surface protections with finishing work. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
 - 1. Special care shall be taken to avoid damaging surrounding surfaces.
- D. Provide fasteners and anchoring devices of suitable size, quantity, and type to secure hardware in proper position for heavy use and long life.
 - 1. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Adjust door closers immediately upon installation. Adjust in exact conformance with manufacturer's printed instructions. Advance backcheck to eliminate shock at dead stop. Set latching speed to assure unassisted positive latching.
 - 1. Degrees of swing of doors for self-limiting closers shall be maximum available.

- F. Install each protection plate with a thinly-spread spot of mastic at its center to assure even contact before fastening with screws. Install all such plates on visual centers of closed doors. Set bottom edges of all such plates flush with door bottom.
- G. Cut and fit thresholds to door frame profiles. Prepare thresholds for the attachment of strikes and clearance for spindles as required. Set thresholds in a continuously laid bed of polyisobutylene mastic sealant to completely fill voids and exclude moisture from every source.
- H. Seal weather protection components attached to the exterior sides of doors and frames, such as drip caps and weatherstripping, in place with clear silicone caulk in such a manner as to ensure a continuously filled seam throughout the joinery.
- I. Cut and fit weatherstripping accurately to provide the greatest possible continuity of the contact element. Adjust closer templating as required.
- J. Apply door bottoms to bottom of door, forming seal with threshold when door is closed.
- K. At exterior doors, obtain satisfactory operation of the installation, then apply a thin layer of clear silicone caulk under hinge leaves, and outside lock trim. Remove excess caulk after torquing fasteners.

3.3 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
 - 1. Clean adjacent surfaces soiled by hardware installation.
- B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.4 INSTRUCTION AND INSPECTION

- A. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
- B. After hardware is installed and adjusted, the Supplier shall inspect the job with the Architect and the Contractor to determine if the hardware is functioning properly.
 - 1. Maintain the instruction sheets, layout templates, and any supplementary literature regarding hardware in a readable condition. Transmit all such items to the Owner's Representative, together with all spare parts, specialized tools, other accessories supplied with the hardware, and a copy of the approved hardware schedule at the time of instruction.
- C. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units at no cost to the Owner. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

HARDWARE SET: 01

DOOR NUMBER:

100

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112HD EPT	313AN	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954	SP313	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-99-EO 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-99-NL-OP-110MD 24 VDC	626	VON
1	EA	SFIC MORTISE CYL.	80-102	626	SCH
1	EA	SFIC RIM HOUSING	80-129	626	SCH
2	EA	PERMANENT CORE	OWNER PROVIDED		
2	EA	90 DEG OFFSET PULL	8190EZHD 10" STD	630-316	IVE
1	EA	OH STOP	100S	695	GLY
1	EA	SURFACE CLOSER	4111 SCUSH MC	695	LCN
1	EA	SURF. AUTO OPERATOR	4642 LONG CS WMS 120 VAC	695	LCN
1	EA	MOUNTING PLATE	4110-18 SRT	695	LCN
1	EA	CUSH SHOE SUPPORT	4110-30 SRT	695	LCN
1	EA	BLADE STOP SPACER	4110-61 SRT	695	LCN
1	EA	ACTUATOR, JAMB MOUNT	8310-818T	630	LCN
1	EA	ACTUATOR, TOUCH	8310-853T	630	LCN
1	EA	RAIN DRIP	142D	D	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	DOOR SWEEP	8197D	D	ZER
1	EA	THRESHOLD	655A-223	A	ZER
1	EA	CARD READER	BY ACCESS CONTROL PROVIDER	BLK	SCE
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
	EA	NOTE	WEATHERSTRIP BY DOOR/FRAME MANUF		B/O

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY. OUTSIDE ACTUATOR ONLY OPERABLE WHEN DOOR IS DOGGED OR AFTER VALID CARD READ, INSIDE ACTUATOR ALWAYS OPERABLE. ALWAYS FREE EGRESS.

HARDWARE SET: 02

DOOR NUMBER:

100A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112HD EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-99-EO 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-99-NL-OP-110MD 24 VDC	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	SFIC MORTISE CYL.	80-102	626	SCH
1	EA	SFIC RIM HOUSING	80-129	626	SCH
2	EA	PERMANENT CORE	OWNER PROVIDED		
2	EA	90 DEG OFFSET PULL	8190EZHD 10" STD	630-316	IVE
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4111 SCUSH MC	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 LONG WMS 120 VAC	689	LCN
1	EA	MOUNTING PLATE	4110-18 SRT	689	LCN
1	EA	CUSH SHOE SUPPORT	4110-30 SRT	689	LCN
1	EA	BLADE STOP SPACER	4110-61 SRT	689	LCN
1	EA	ACTUATOR, JAMB MOUNT	8310-818T	630	LCN
1	EA	ACTUATOR, TOUCH	8310-853T	630	LCN
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	CARD READER	BY ACCESS CONTROL PROVIDER	BLK	SCE
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	POWER SUPPLY	BY ACCESS CONTROL PROVIDER	LGR	SCE
1	EA	INTERCOM	BY ACCESS CONTROL PROVIDER		

NOTE: PROVIDE CLOSER DROP PLATES AND MOUNTING BRACKETS AS REQUIRED. OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY. OUTSIDE ACTUATOR ONLY OPERABLE WHEN DOOR IS DOGGED OR AFTER VALID CARD READ, INSIDE ACTUATOR ALWAYS OPERABLE. ALWAYS FREE EGRESS.

HARDWARE SET: 03

DOOR NUMBER:

107

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112HD EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-QM-9927-L-DT-LBR-06 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-QM-9927-L-NL-LBR-06 24 VDC	626	VON
1	EA	SFIC MORTISE CYL.	80-102	626	SCH
1	EA	SFIC RIM HOUSING	80-129	626	SCH
2	EA	PERMANENT CORE	OWNER PROVIDED		
2	EA	SURFACE CLOSER	4111 SCUSH MC	689	LCN
2	EA	CUSH SHOE SUPPORT	4110-30 SRT	689	LCN
2	EA	BLADE STOP SPACER	4110-61 SRT	689	LCN
1	EA	WEATHERSTRIPPING	8217SBK PSA	BK	ZER
1	EA	CARD READER	BY ACCESS CONTROL PROVIDER	BLK	SCE
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	POWER SUPPLY	BY ACCESS CONTROL PROVIDER	LGR	SCE
1	EA	INTERCOM	BY ACCESS CONTROL PROVIDER		

NOTE: PROVIDE CLOSER DROP PLATES AND MOUNTING BRACKETS AS REQUIRED. OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY OR VIA KEY. OUTSIDE ACTUATOR ONLY OPERABLE WHEN DOOR IS DOGGED OR AFTER VALID CARD READ, INSIDE ACTUATOR ALWAYS OPERABLE. ALWAYS FREE EGRESS.

HARDWARE SET: 04

DOOR NUMBER:

139

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112HD EPT	313AN	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-99-NL-OP-110MD 24 VDC	626	VON
1	EA	SFIC MORTISE CYL.	80-102	626	SCH
1	EA	SFIC RIM HOUSING	80-129	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	90 DEG OFFSET PULL	8190EZHD 10" STD	630-316	IVE
1	EA	SURFACE CLOSER	4111 SCUSH MC	695	LCN
1	EA	MOUNTING PLATE	4110-18 SRT	695	LCN
1	EA	CUSH SHOE SUPPORT	4110-30 SRT	695	LCN
1	EA	BLADE STOP SPACER	4110-61 SRT	695	LCN
1	EA	RAIN DRIP	142D	D	ZER
1	EA	THRESHOLD	655A-223	A	ZER
1	EA	CARD READER	BY ACCESS CONTROL PROVIDER	BLK	SCE
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
	EA	NOTE	WEATHERSTRIP BY DOOR/FRAME MANUF		B/O

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY. ALWAYS FREE EGRESS.

HARDWARE SET: 05

DOOR NUMBER:

107B 119

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112HD / 224HD (AS REQUIRED)	313AN	IVE
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	SURFACE CLOSER	4111 SCUSH MC	689	LCN
1	EA	MOUNTING PLATE	4110-18 SRT	695	LCN
1	EA	CUSH SHOE SUPPORT	4110-30 SRT	695	LCN
1	EA	BLADE STOP SPACER	4110-61 SRT	695	LCN
1	EA	RAIN DRIP	142D	D	ZER
1	EA	DOOR SWEEP	8197D	D	ZER
1	EA	THRESHOLD	655A-223	A	ZER
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
	EA	NOTE	WEATHERSTRIP BY DOOR/FRAME MANUF		B/O

HARDWARE SET: 06

DOOR NUMBER:

101 101A 132A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	LV9080BD 06A	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4111 EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	CARD READER	BY ACCESS CONTROL PROVIDER	BLK	SCE
1	EA	DOOR CONTACT	679-05WD	BLK	SCE
1	EA	POWER SUPPLY	BY ACCESS CONTROL PROVIDER	LGR	SCE

OPERATION: DOOR ALWAYS CLOSED AND LOCKED. ENTRY BY VALID CARD READ. FREE EGRESS AT ALL TIMES BY INSIDE LEVER.

HARDWARE SET: 07

DOOR NUMBER:

107C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	LV9080BD 06A	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4011 MC	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	CARD READER	BY ACCESS CONTROL PROVIDER	BLK	SCE
1	EA	DOOR CONTACT	679-05WD	BLK	SCE
1	EA	POWER SUPPLY	BY ACCESS CONTROL PROVIDER	LGR	SCE

OPERATION: DOOR ALWAYS CLOSED AND LOCKED. ENTRY BY VALID CARD READ. FREE EGRESS AT ALL TIMES BY INSIDE LEVER.

HARDWARE SET: 08

DOOR NUMBER:

104

105

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8302 10" 4" X 16"	630	IVE
1	EA	HANDS FREE PULL	FP100	630	IVE
1	EA	SURFACE CLOSER	4011 MC	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 09

DOOR NUMBER:

103

120

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE

HARDWARE SET: 10

DOOR NUMBER:

106 113 125 127 142

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	OFFICE W/SIM RETRACT W/ OUTSIDE INDICATOR	L9056BDC 06A 09-544 OS-OCC	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	SURFACE CLOSER	4011 MC	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 11

DOOR NUMBER:

110 111 112 114 115 116
 117 118 121 122 123 128
 129 132 133 135 136 137
 138 140 141 143 144 145
 146 147 148

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BD 06A L583-363	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	WALL STOP	WS406/407CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 11A

DOOR NUMBER:

102

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BD 06A L583-363	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	WALL STOP	WS406/407CVX	626	IVE

HARDWARE SET: 12

DOOR NUMBER:

107A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	L9070BD 06A	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 13

DOOR NUMBER:

130

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	STOREROOM W/DEADBOLT	L9480BDC 06A 09-544	626	SCH
2	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	SURFACE CLOSER	4011 MC	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 14

DOOR NUMBER:

109

126

131

133A

134

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080BD 06A	626	SCH
1	EA	PERMANENT CORE	OWNER PROVIDED		
1	EA	SURFACE CLOSER	4011 MC	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	626	IVE
3	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 15

DOOR NUMBER:

133B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1			HARDWARE BY DOOR / FRAME MANUFACTURER		

DOOR/HARDWARE INDEX

DOOR #	HwSet #
100	01
100A	02
101	06
101A	06
102	11A
103	09
104	08
105	08
106	10
107	03
107A	12
107B	05

DOOR #	HwSet #
107C	07
109	14
110	11
111	11
112	11
113	10
114	11
115	11
116	11
117	11
118	11
119	05

DOOR #	HwSet #
120	09
121	11
122	11
123	11
125	10
126	14
127	10
128	11
129	11
130	13
131	14
132	11

DOOR #	HwSet #
132A	06
133	11
133A	14
133B	15
134	14
135	11
136	11

DOOR #	HwSet #
137	11
138	11
139	04
140	11
141	11
142	10
143	11

DOOR #	HwSet #
144	11
145	11
146	11
147	11
148	11

END OF SECTION

SECTION 088000 - GLAZING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - a. Windows.
 - b. Doors.
 - c. Interior borrowed lites.
 - d. Storefront framing.
 - e. Glazed entrances.
 - f. Display case doors and display case shelving.
 - 2. Glazing sealants and accessories.
 - 3. Glass types include:
 - a. Fully Tempered Monolithic Float Glass.
 - b. Laminated Glass.
 - c. Insulated Glass.
 - d. Insulated Fully Tempered Glass.
 - e. Security Glazing.
 - 1) Forced Entry Resistant Glass - Insulated.
 - f. Specialty/Decorative Glass.
 - 1) Decorative Film Overlay.
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for those alternates effecting work of this Section.
 - 2. Section 064023 "Interior Architectural Woodwork" for Display Case Doors.
 - 3. Section 084113 "Aluminum Framed Entrances and Storefronts."
 - 4. Section 085613 "Transaction Windows."

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 units.

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 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 119: Fire Tests of Building Construction and Materials.
- B. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings.

- C. Consumer Product Safety Commission (CPSC):
 - 1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials, Category II.

1.5 PREINSTALLATION MEETINGS

- A. Pre-installation 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.
 - 3. Review drawings for locations and details of glazing.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.7 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
 - 1. For security "forced entry resistant" glass, include UL listing verification and UL-752 Test Results.
 - 2. For security "forced entry resistant" glass, include manufacturer's written installation and cleaning instructions.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square. Submit the samples listing glass type corresponding to Glass Legend indicated on Drawings and as follows:
 - 1. Tinted Fully Tempered Monolithic Float Glass.
 - 2. Laminated Glass.
 - 3. Insulated Glass.
 - 4. Insulated Fully Tempered Glass.
 - 5. Security Glazing:
 - a. Forced Entry Resistant Glass - Insulated.
 - 6. Specialty Glass:
 - a. Decorative Film Overlay.
 - 1) Glazing Film Overlay Samples: Submit colored manufacturer's standard sample sets showing full range of colors available for each type and color indicated.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
 - 1. Indicate coordinated dimensions of security glazing and construction that receives security glazing, including clearances and glazing channel dimensions.
- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- E. Field Dimensions for Custom Digital Artwork Ceramic Ink Glazing: Provide field dimensions to Architect for graphic design of digital artwork graphics. Include dimensions, locations, and graphic depictions of all disruptions within the field of glazing surface indicated to receive digital artwork. Examples of disruptions of wall surface include, but are not limited to: frames, mullions, etc.
 - 1. Elevations and dimensions shall be drawing using a computer aided drafting program and submitted in a legible format.
 - 2. Dimensional Tolerance: 1/8 inch maximum.
 - 3. Dimensions shall be reviewed and accepted by signage manufacturer prior to submittal of shop drawings.

1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For the following:
 - 1. Installers.
 - 2. Manufacturers of insulated glass units with low-E coatings.
 - 3. Glass testing agency.
 - 4. Sealant testing agency.
- B. Product Certificates: For each type of glass and glazing product, from manufacturer. For glass.
- C. Product Test Reports: For glazing sealants, for tests performed by a qualified testing agency.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.

1.9 CLOSEOUT SUBMITTALS

- A. Warranties: Sample of special warranties.

1.10 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- D. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- E. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:
 - 1. H. P. White Laboratory, Inc.
 - 2. Underwriters Laboratories, Inc.
 - 3. Wiss, Janney, Elstner Associates, Inc.
 - 4. ASTM C1172-09 Standard Specification for Laminated Architectural Flat Glass.
 - 5. ASTM F1233-98 Standard Test Method for Security Glazing Materials And Systems.
 - 6. ISO 16936-2:2005 Glass In Building - Forced-Entry Security Glazing - Part 2: Test And Classification By Repetitive Impact Of A Hammer And Axe At Room Temperature.
- F. Safety Glazing Labeling: Where safety glazing labeling 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.

- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- H. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Install glazing in mockups specified in related Sections indicated below to match glazing systems required for Project, including glazing methods.
 - a. Section 084113 "Aluminum-Framed Entrances and Storefronts".
 - 2. Install security glazing in mockups specified in related Sections indicated below to match glazing systems required for Project, including security glazing methods.
 - a. Section 084113 "Aluminum-Framed Entrances and Storefronts."
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.11 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.

1.12 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.
- B. Environmental Limitations for Fire Glazing: 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.

1.13 WARRANTY

- A. 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.
- B. 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.
- C. 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.

- D. Manufacturer's Special Warranty for Security Glass: Manufacturer agrees to replace security glass that deteriorates within specified warranty period. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced standard, yellowing, and loss of light transmission.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- E. Special Warranty for Glazing Film Overlay: Manufacturer's standard form in which glazing film manufacturer agrees to replace glazing film units that deteriorate within specified warranty period. Deterioration of glazing film is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glazing film 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 for Glazing Films: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type
 - 1. Obtain tinted glass from single source from single manufacturer.
 - 2. Obtain insulating glass from single source from single manufacturer.
 - 3. Obtain laminated glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each laminated glazing type.
 - 4. Obtain security glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each security glazing type.
 - 5. Obtain decorative glazing film overlay from single source from single manufacturer for each product and installation method.
- 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 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.
 - 1. Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing. Design glass, including comprehensive engineering analysis according to the ICC's International Building Code (IBC) listed on Drawings and ASTM E 1300 by a qualified professional engineer, using design criteria set forth in Article 2.2 and as follows:
 - 1. Design Wind Pressures: As indicated on Drawings.
 - 2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
 - a. Wind Design Data: As indicated on Drawings.
 - 3. Design Snow Loads: As indicated on Drawings.
 - 4. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 - 5. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 - 6. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 - 7. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

- C. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for Wind Zone 4 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
 - 1. Large-Missile Test: For glazing located within 30 feet of grade.
 - 2. Small-Missile Test: For glazing located more than 30 feet above grade.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 - 2. For laminated-glass lites, properties are based on products of construction indicated.
 - 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 - 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 - 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
 - 7. Self-ignition temperature of 650 deg F or more when tested according to ASTM D 1929 on plastic sheets in thicknesses indicated for the Work.
 - 8. Smoke-Developed Index of 450 or less when tested according to ASTM E 84, or smoke density of 75 or less when tested according to ASTM D 2843 on plastic sheets in thicknesses indicated for the Work.
 - 9. Burning extent of 1 inch or less when tested according to ASTM D 635 at a nominal thickness of 0.060 inch or thickness indicated for the Work.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: "Glazing Manual."
 - 2. GANA Publications: "Laminated Glazing Reference Manual"
 - 3. 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 Safety Glazing Certification Council (SGCC) or another certification agency acceptable to authorities having jurisdiction or manufacturer. 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 lites in thicknesses as needed to comply with requirements indicated.
 - 1. Minimum Glass Thickness for Exterior Lites: 6.0 mm, except where specifically indicated otherwise.
- E. Strength:
 - 1. Where 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.
 - 2. 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.
 - 3. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. 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.
- B. Fully-Tempered Monolithic 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. Low-E-Coated Vision Glass: Coated by pyrolytic process or vacuum deposition (sputter-coating) process, and complying with other requirements specified.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products listed below or comparable products from other manufacturers meeting specified requirements, and which are submitted to and accepted by Architect prior to bidding.
 - a. Vitro; "Solarban 70 Solar Control (formerly Solarban 70 XL)"
 - 1) Low-E coating and Tint color selected shall match existing at each project site as determined by Architect and Owner.
 - 2. Kind: Kind CV (coated vision glass).
 - 3. Glass: Clear and tinted float. Refer to Glass Types Schedule at end of this Section.
 - 4. Performance Criteria: Refer to Glass Types Schedule at end of this Section.
- D. Glass Types: Refer to Glass Type Schedules at end of this Section.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. 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 the following interlayer types to comply with interlayer manufacturer's written instructions.
 - a. Polyvinyl butyral interlayer.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.
 - 4. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Laminated Glass Schedule" at end of this Section.
- B. Glass Types: Refer to Glass Type Schedules at end of this Section.

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 polyisobutylene and silicone, primary and secondary seals, respectively.
 - 2. Perimeter Spacer: Aluminum with black, color anodic finish .
 - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.
- B. Glass Types: Refer to Glass Type Schedules at end of this Section.

2.7 FORCED ENTRY RESISTANT SECURITY GLAZING

- A. Insulating Security Glazing: Factory-assembled units, consisting of sealed lites of glazing material indicated separated by a dehydrated interspace, qualified according to ASTM E 2190

1. Sealing System: Dual seal, with polyisobutylene and silicone, primary and secondary seals, respectively.
 2. Perimeter Spacer: Aluminum with black, color anodic finish .
 3. Desiccant: Molecular sieve or silica gel, or blend of both.
- B. Air-Gap Security Glazing: Factory-assembled units, consisting of sealed lites of glazing material indicated separated by a dehydrated interspace.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 2. Spacer Specifications: Manufacturer's standard spacer material and construction.
- C. Glass Types: Refer to Glass Type Schedules at end of this Section.
- D. Comply with testing criteria:
1. ASTM F1233 Class 1.4 Standard Test Method for Security Glazing Materials and Systems.
 2. HP White Laboratories-Test Protocol (HPW-TP) 0500.02 Transparent Materials for Use in Forced Entry or Containment Barriers.

2.8 SPECIALTY / DECORATIVE GLAZING

- A. Glazing Film Overlay (088000.A93): Glass with decorative adhesive-backed colored film overlay. Use dimensionally stable, optically clear polyester film with UV stable, pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.
1. Refer to Glazing schedule in Part 3 -Execution for product informaton.
 2. Use: Suitable for interior applications.
 3. Accessories: Provide accessories complying with glazing film manufacturer's requirements for application indicated, with proven record of compatibility with surfaces contacted.
 - a. Adhesives: Pressure sensitive acrylic adhesive system.
 - b. Cleaners, Primers and Sealers: Types recommended by glazing film manufacturer.

2.9 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
1. EPDM complying with ASTM C 864.
 2. Silicone complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned EPDM or silicone gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.10 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. Provide glazing sealants 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.
 3. Security Glazing Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 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. Applications:

- C. Security Sealant: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement complying with ASTM C 920, Grade NS, Class 12.5 or 25, Use NT, and with a Shore A hardness of at least 45 when tested according to ASTM C 661.

2.11 GLAZING TAPES

- A. General: Provide glazing tapes 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. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- C. 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.

2.12 MISCELLANEOUS GLAZING MATERIALS

- A. General:
1. 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.
 2. 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. 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.

2.13 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. 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.
 - 1. Provide ground and polished edges for glass doors and shelving at display cases.
 - 2. Provide ground and polished edges for glass shelving at merchandising walls.

2.14 FABRICATION OF SECURITY GLAZING

- A. Fabricate security glazing 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.
- B. Grind smooth and polish exposed security glazing 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. Minimum required bite.
 - a. No less than 1/2" on all 4 sides.
 - 5. 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.
 - 1. Use methods approved by testing agencies that listed and labeled fire-resistive glazing or fire-protective glazing products.
- 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.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- 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 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 GLAZING FILM OVERLAY INSTALLATION

- A. General: Comply with glazing film manufacturer's written instructions for preparation and installation.
 - 1. Apply squarely aligned to glass edges, uniformly smooth, and free from tears, air bubbles, wrinkles, and rough edges completely overlaying the back face of clean glass.
 - 2. Install film continuously in longest practicable lengths. Install with no gaps and no overlaps.
 - 3. If seamed, install with no gaps and no overlaps. Install seams vertical and plumb. Horizontal seams are not allowed.
 - 4. Delay removal of release liner from film until just before each piece of film is cut and ready for installation.
 - 5. Install film with mounting solution and custom cut to glass with neat, square corners and edges tight to window frame.
 - 6. Remove air bubbles, wrinkles, blisters and other defects, banding, thin spots and pinholes.
 - a. Where installed film does not meet this criteria, it shall be removed and replaced with new film.

3.8 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. 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; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. 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.
- F. Remove excess glazing film mounting solution at finished seams, perimeter edges and adjacent surfaces. Use cleaning methods recommended by glazing film manufacturer. Remove and replace films that cannot be cleaned.

3.9 HEAT TREATED MONOLITHIC GLASS SCHEDULE

- A. Glass Type 12 - Clear Fully Tempered monolithic float glass (088000.A12):
 - 1. 3/8 inch (9.5 mm).
 - 2. Visible Light Transmittance: 85 percent minimum.
 - 3. Provide safety glazing labeling.

3.10 LAMINATED GLASS SCHEDULE

- A. Glass Type 21 - Clear laminated glass **[ultraclear]**. (088000.A21)
 - 1. Basis-of-Design Product: Vitro Architectural Glass
 - 2. Two plies of fully tempered float glass.
 - 3. Minimum Thickness of Each Glass Ply: 6mm.
 - 4. Interlayer Thickness: 0.060 inch.
 - 5. Safety glazing required.

3.11 INSULATING GLASS SCHEDULE

- A. Glass Type 31 - Low-E-coated, clear insulating glass (088000.A31)
 - 1. Overall Unit Thickness: 1 inch (24 mm)
 - a. Minimum Thickness of Each Glass Lite: 1/4 inch (6 mm).
 - 2. Outdoor Lite: Heat strengthened clear and low-E coated float glass.
 - a. Low-E Basis of Design Product:
 - 1) Vitro Architectural Glass; "Solarban 70 Solar Control (formerly Solarban 70 XL)"
 - 3. Interspace Content: Air
 - 4. Indoor Lite: Heat strengthened clear float glass.
 - 5. Product Characteristics:
 - a. SOLARBAN 70 (Clear + Clear)
 - b. Visible Light Transmittance: 64 percent minimum.
 - c. Visible Light Reflectance (Exterior): 10 to 12 percent.
 - d. Winter Nighttime U-Factor (air): 0.28 maximum.
 - e. Solar Heat Gain Coefficient: 0.27 maximum.
 - f. Light-to-Solar Gain Ratio (LSG): 2.30 minimum.
 - g. Safety glazing required.

3.12 INSULATING FULLY-TEMPERED GLASS SCHEDULE

- A. Glass Type 41 - Low-E-coated, clear insulating fully tempered glass (088000.A41)
 - 1. Overall Unit Thickness: 1 inch (24 mm)
 - a. Minimum Thickness of Each Glass Lite: 1/4 inch (6 mm).
 - 2. Outdoor Lite: Fully tempered, clear and low-E coated float glass.
 - a. Low-E Basis of Design Product:
 - 1) Vitro Architectural Glass; "Solarban 70 Solar Control (formerly Solarban 70 XL)"
 - b. Low-E Coating: Sputter coated on second surface.
 - 3. Interspace Content: Air
 - 4. Indoor Lite: Fully tempered clear float glass.
 - 5. Product Characteristics:
 - a. Visible Light Transmittance: 64 percent minimum.
 - b. Visible Light Reflectance (Exterior): 13 to 14 percent.
 - c. Winter Nighttime U-Factor (air): 0.28 maximum.
 - d. Solar Heat Gain Coefficient: 0.27 maximum.
 - e. Light-to-Solar Gain Ratio (LSG): 2.30 minimum.
 - f. Safety glazing required.

3.13 FORCED ENTRY GLAZING SCHEDULE

- A. Glass Type 82 - Forced Entry Insulated Glass - Clear Low-E coated, clear insulated laminated security glass. (088000.A82)
1. Indoor Lite: Basis of Design: Subject to compliance with requirements, provide LTI Smart Glass, Inc; School Guard Glass "SG5-IGU" laminated security glass. Comparable products meeting specified requirements, from one of the following will be considered when submitted to and accepted by the Architect prior to bidding.
 - a. Global Security Glazing; Child Guard, comparable product.
 - b. Armoured One, comparable product.
 - c. McGrory "DefendED" comparable product.
 2. Overall Unit Thickness: Contractor shall coordinate window and door systems for installation requirements with window and door assemblies.
 - a. Thickness: 1-1/16 inch.
 3. Outdoor Lite: Fully tempered clear sputter-coated float glass.
 - a. Low-E Coating: Sputtered second surface.
 - 1) Basis-of-Design Product: Vitro Architectural Glass; Solarban 70.
 - b. Thickness Glass Lite: 1/4 inch nominal.
 4. Interspace Content: 3/8 inch Air space.
 5. Indoor Lite Description: 7/16" School Guard SG5.
 6. Forced Entry Resistance Performance Level:
 - a. ASTM F1233 Testing: Class 1.4 minimum, having not less than 6 minutes forced entry resistance.
 - b. UL 972 / HP White 5aa-1 Testing: Pass the UL972/HP White Test 5aa-1 for 12 minutes minimum forced entry resistance.
 7. Performance Data:
 - a. U-Value: 0.30.
 - b. SHGC: 0.27.
 - c. Visual Light Trans.: 0.60.
 - d. Shading Coefficient: 0.31.
 - e. Relative Heat Gain: 66.94.
 8. Safety glazing required. Provide safety glazing labeling.
 9. Comply with Security glazing bite requirement, 1-inch minimum.

3.14 SPECIALTY / DECORATIVE GLAZING

- A. Glass Type 93 - Privacy Film (088000.A93 - **WF1**).
1. Basis of Design Products: Subject to compliance with requirements, provide "Fasara" by 3M or a comparable product with the following criteria proposed to and accepted by Architect prior to bidding.
 2. Product: SH2FGAR, "Aerina"
 3. Product Family: Gradation
 4. Material: Polyester.
 5. Visible Light Reflectance Interior: 13%
 6. Visible Light Transmittanc: 79 %
 7. Adhesive type: Manufacturer's standard releasable pressure sensitive adhesive.
 8. Adhesive color: As selected by Architect from manufacturer's full range.
 9. Liner: Transparent synthetic.
 10. Chemical Resistance: Resists mild alkalis, mild acids, and salt. Excellent resistance to water.
 11. Pattern: As selected by Architect from manufacturer's full range of translucent options.

END OF SECTION 088000

SECTION 092116 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions (092116.A01).
 - 2. Suspension systems for interior ceilings, bulkheads, soffits, and exterior soffits.
 - a. For spans exceeding 8 feet in any direction refer to Section 054000 for design requirements.
 - 3. Grid suspension systems for gypsum board ceilings (092116.A06).
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for description of alternates affecting work of this Section.
 - 2. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; and ceiling joists. In addition, for all interior soffits and ceilings with an unsupported span in any direction exceeding 8 feet.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. 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."

1.3 INFORMATIONAL SUBMITTALS

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association or the Steel Stud Manufacturers Association.
- B. Evaluation Reports: For embossed steel studs and runners and firestop tracks, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. 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.
- B. Horizontal Deflection: For wall assemblies, limited to 1/360 of the wall height based on horizontal loading of 5 lbf/sq. ft..

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 or coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners (092116.A01): ASTM C 645. Use either steel studs and runners or embossed steel studs and runners.

1. Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: 0.0296 inch.
 - b. Provide 0.0296 inch minimum base metal thickness for studs and runners at walls indicated to receive tile, walls indicated to receive abrasion-resistant drywall, impact-resistant drywall, and at other locations indicated.
 - c. Depth: 3-5/8 inches, unless otherwise indicated.
2. Embossed Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: 0.0147 inch.
 - b. Provide 0.025 inch minimum base metal thickness for studs and runners at walls indicated to receive tile, walls indicated to receive abrasion-resistant drywall, impact-resistant drywall, and at other locations indicated.
 - c. Depth: 3-5/8 inches, unless specifically indicated otherwise.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
 1. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit over inside runner and one gauge heavier than gauge for wall construction indicated.
- 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.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. Minimum Base-Metal Thickness: 0.0296 inch.
- F. Furring Channels (Furring Members) (09216.A03):
 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
- G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
 1. Depth: 1-1/2 inches.
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels (092116.A02): ASTM C 645.
 1. Minimum Base-Metal Thickness: 0.0179 inch.
 2. Depth: 7/8 inch, unless specifically indicated otherwise.
- I. Z-Shaped Furring (092116.A04): With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.
- J. Pre-Manufactured Curved Track:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich; "Contour Track" or comparable product meeting specified requirements, submitted to and accepted by Architect prior to bidding.
 2. Gauge: Match studs.
 3. Depth: Match studs.
- K. Partial Height Wall Framing, Mid Wall Supports:
 1. Provide: "MidWall" by the Steel Network or comparable product submitted prior to bid meeting criteria listed below.
 - a. Depth: 6" web depth.
 - b. Height: 24."
 2. MidWall: ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H), 50ksi (340MPa) minimum yield strength, 65ksi (450MPa) minimum tensile strength, G90 (Z275) hot-dipped galvanized coating.
 - a. Material Thickness = 118mil (10 gauge, 0.1242" design thickness) for 362MW.
 3. MidWall Plate: ASTM A36/A36M: 36ksi (250MPa) minimum yield strength, 58-80ksi (400-550MPa) tensile strength, 1/2" minimum thickness.

2.3 SUSPENSION SYSTEMS

- A. Hanger Attachments to Concrete:
 - 1. Anchors: Capable of sustaining a load equal to 5 times that imposed as determined by ASTM E488.
 - a. Type: Post installed, chemical anchor or post-installed, expansion anchor.
 - 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.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- C. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- D. Carrying Channels (092116.A05): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges, 3/4 inch deep. Hot-dip galvanize carrying channels in exterior locations to at least G40 requirements.
 - 1. Depth: 2 inches.
- E. Grid Suspension System for Gypsum Board Ceilings and Soffits (092116.A06): At Contractor's option, pre-manufactured grid suspension systems may be used. Grid suspension system shall comply with ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armstrong World Industries, Inc; Drywall Grid Systems.
 - b. Chicago Metallic Corporation; 640/660 Drywall Ceiling Suspension.
 - c. United State Gypsum Company; Drywall Suspension System.
- F. Furring Channels (Furring Members) (09216.A03) :
 - 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
 - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
 - 3. 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.
- G. Hat-Shaped, Rigid Furring Channels (092116.A02): ASTM C 645, 7/8 inch deep.
 - 1. Minimum Base-Metal Thickness: 0.0179 inch.
- H. Z-Shaped Furring (092116.A04): With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

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. Vertical Isolation Strips at Exterior Walls: Provide one of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
- C. Isolation Strips beneath Runner Tracks at Exterior Walls: Provide the following:
 - 1. Polyethylene-sheet-backed rubberized asphalt membrane, 40 mils thick. Field cut to match widths of runners.
- D. Resilient Sound Isolation Clips: Subject to compliance with requirements, provide "RSIC-1" by PAC International or a comparable product submitted to and accepted by Architect prior to bidding with the following product characteristic.
 - 1. Rubber Isolator

- a. Natural and Manufactured rubber compound
 - b. Molded to isolate ferrule from clip
 - c. Minimum of 12 micro-vibration controlling pedestal at point of contact with framing member.
 - d. Manufactured to ASTM D2000, M2 AA 510 A13, which includes:
 - 1) Hardness, ASTM D2240, Shore A: 47 min
 - 2) Modulus 300 Percent, ASTM D412, Die C: 5.3 MPa.
 - 3) Tensile Strength, ASTM D412, Die C: 11.2 MPa
 - 4) Elongation at Break, ASTM D573: 454 percent.
 - 2. Clip: Galvanized or aluminum-zinc coated steel, 16 gauge.
 - 3. Ferrule: Zinch-electroplated steel.
 - 4. Projection: 1-5/8 inches from supporting structure, when 7/8-inch drywall furring channels are used.
- E. Deck-Suspended Ceiling Hangers: Subject to compliance with requirements, provide Kinetics Noise Control; "ICC Deck-Supported Ceiling Isolation Hanger". Comparable products from other manufacturers will be considered.
- 1. Hanger shall include a 1-inch rated deflection spring in series with a neoprene cup.
 - 2. Hanger shall be equipped with a clip/leveling rod assembly, designed to receive a 16 gauge steel carrying channel.

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.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

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.
 - 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
 - 2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
 - 3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.
- 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. Where runner tracks for exterior walls are installed directly against concrete or dissimilar metals, install rubberized asphalt isolation strips between bottom of runner track and concrete.
- D. Install studs so flanges within framing system point in same direction.
- E. 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, having a minimum base metal thickness of 0.0296 inches, at each jamb.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch 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. At Contractor's Option, Provide and install premanufactured curved track system or bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - c. 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 o.c.
- F. 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 o.c.
- G. Z-Shaped Furring Members:
 - 1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches 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 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 from corner and cut insulation to fit.
- H. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING SOUND ISOLATION CLIPS AND CEILING HANGERS

- A. Install ceiling hangers, resilient sound isolation clips and drywall furring channels in accordance with manufacturer's written instructions.
 - 1. Locate resilient sound isolation clips maximum of 8 inches from ends of dry wall furring channels.
- B. Mechanically fasten resilient sound isolation clips to structure with screws, bolts, or expansion anchors, dependent upon structure.
- C. Fire-Resistive Design Assemblies:
 - 1. Install as specified in UL Fire Resistance Directory, where required.
 - 2. Do not arbitrarily add resilient sound isolation clips to fire-rated assemblies.
- D. Space resilient sound isolation clips at maximum of 24 inches by 48 inches on center for walls and ceilings.
- E. Do not exceed design load (pull and shear) of 36 pounds per isolation clip.
- F. Stagger isolation clip installation, so dead load is supported by all support members.
- G. Space ceiling hangers as recommended by manufacturer.
 - 1. Do not exceed design load (pull and shear) of ceiling hanger.
- H. Splicing Drywall Furring Channels:
 - 1. Splice drywall furring channels with minimum of 6-inch (150-mm) laps.
 - 2. Secure laps with 2 framing screws or 18 gauge tie wire double wrapped.
 - 3. Locate splices between resilient sound isolation clips.
 - 4. Do not locate splices on resilient sound isolation clips.
- I. Install resilient sound isolation clips on 1 side of wall assembly, unless otherwise indicated on the drawings.
- J. Flanking Noise:
 - 1. Review installation details to prevent structure-borne flanking noise.
 - 2. Do not allow drywall furring channels or gypsum board to contact foreign materials, including floors, ceilings, or wall framing members.
- K. Ensure metal ferrule of resilient sound isolation clips is in firm contact with structural member.
- L. Gypsum Board:
 - 1. Install gypsum board in vertical or horizontal position with 1/8-inch to 1/4-inch gap around perimeter for acoustical sealant application.
 - 2. Install gypsum board in accordance with ASTM C 840 as specified in Section 092900.
- M. Acoustical Sealant:
 - 1. Seal potential air leaks with acoustical sealant to achieve best Field Sound Transmission Class (FSTC).
 - 2. Seal electrical outlets and penetrations with acoustical sealant.
 - 3. Apply fire-rated acoustical sealant at locations where fire-rated assembly is required.
- N. Putty Pad Sealant: Acoustically seal with putty pads, electrical boxes in walls and ceilings in which resilient sound isolation clips are used.

3.6 INSTALLING SUSPENSION SYSTEMS

- A. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement. 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 o.c.
 - 2. Carrying Channels (Main Runners): 48 inches o.c.
 - 3. Furring Channels (Furring Members): 16 inches o.c.

- B. 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. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- C. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- D. 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.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092116

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SECTION 092900 - GYPSUM BOARD

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - a. Gypsum Board, Type X (092900.A02).
 - b. Mold-Resistant Gypsum Board (092900.A06).
 - c. Flexible Gypsum Board (092900.A16).
 - 2. Tile backing panels (092900.A10).
 - 3. Expansion control joint (092900.A12).
 - 4. Sound attenuation blankets (092900.A14).
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for description of alternates effecting work of this Section.
 - 2. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
 - 3. Section 092116 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
 - 4. Division 26 Sections for electrical connections to lighting components within trim pieces.

1.2 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-long length for each trim accessory indicated.
- C. Samples for Verification: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

1.3 QUALITY ASSURANCE

- A. Integrated Field Sample: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build integrated field sample 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 Substantial Completion.
- B. Mockup Submittal: If using structural laminate, provide a finished gypsum board outside corner edge condition a minimum 12 inch long in length. Outside corner edge mockup shall illustrate the transition between metal edge trim and structural laminate edge trim.

1.4 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.

1.5 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.

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. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Lafarge North America, Inc.
 - 4. National Gypsum Company.
 - 5. USG Corporation.
- B. Gypsum Board, Type X (092900.A02): ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- C. Mold-Resistant Gypsum Board (092900.A06): ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- D. Flexible Gypsum Board (092900.A16): ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
 - 1. Thickness: 1/4 inch.
 - 2. Long Edges: Tapered.

2.4 TILE BACKING PANELS

- A. Cementitious Backer Units (092900.A10): ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.

1. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following products or a comparable product, with the following product characteristics, submitted to and accepted by Architect prior to bidding.
 - a. C-Cure.; C-Cure Board 990
 - b. National Gypsum Company.; Permabase Cement Board.
 - c. USG Corporation.; DUROCK Cement Board.
2. Thickness: 5/8 inch.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

- A. Interior Trim (092900.A11): ASTM C 1047.
 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - a. At Contractor's option, interior trim may be a structural laminate drywall corner system using "No-Coat" products as manufactured by Certainteed or a comparable product submitted to and accepted by Architect prior to bidding.
 2. Shapes:
 - a. Cornerbead.
 - b. L-Bead: L-shaped; exposed long flange receives joint compound.
 - c. J-Bead: J-shaped; exposed short flange does not receive joint compound.
 - d. Expansion (control) joint.
 - e. Curved-Edge Cornerbead: With notched or flexible flanges.
 - f. Wall end cap: Provide "Fast Cap" as manufactured by Trim-Tex Drywall Products.

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.
 3. Cementitious Backer Units: As recommended by backer unit 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 drying-type, all-purpose compound.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
 - a. Where specifically indicated on Drawings, provide a setting-type, sandable topping compound for trowel-applied skim coat.
- D. Joint Compound for Tile Backing Panels:
 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

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 CFR 59, Subpart D (EPA Method 24).

2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- 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 thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- E. Sound-Attenuation Blankets (092900.A14): 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.
 2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- F. Acoustical Impaling clips (092900.A14): Galvanized sheet metal impaling clips each with 8 spikes that stick onto the fiberglass and hold the panel in place; 2-1/8" x 1-1/2"; install by either drywall screws or attached with adhesive as recommended by the manufacturer.
- G. Acoustical Joint Sealant (092900.A15): 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.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following products or a comparable product, with the following product characteristics, submitted to and accepted by Architect prior to bidding.
 - a. Accumetric LLC.; BOSS 824 Acoustical Sound Sealant.
 - b. Pecora Corporation.; AIS-919.
 - c. USG Corporation.; SHEETROCK Acoustical Sealant.

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 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. 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-wide joints to install sealant.
 - 4. Where ceilings in showers abut adjacent walls, Provide 1/4- to 3/8-inch-wide spaces and trim edges with plastic edge trim to allow for sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-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. 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. Type X: Vertical and horizontal surfaces of walls, soffits, bulkheads and ceiling surfaces unless otherwise indicated.
 - 2. Flexible Type: Apply in double layer at curved assemblies and at other locations as indicated on Drawings.
 - 3. Impact-Resistant Type: Refer to Drawings for locations required.
 - 4. Tile Backing Panels: Restroom walls indicated to receive tile. [
 - 5. Moisture and Mold Resistant Type X: Exterior walls and restrooms, except at walls indicated to receive tile. Restrooms and wet walls (such as behind electric drinking fountains, behind janitor's sink and sinks).
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. 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.
 - 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. 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.
 - 3. On Z-shaped 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.
 - 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-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 o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11
 1. Locations:
 - a. At shower ceiling locations and vertical surfaces indicated to receive tile
 - b. At showers, tubs, and where indicated
 - c. 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 according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners.
 2. L-Bead: Use where indicated.
 3. U-Bead: Use at exposed panel edges.
 4. Curved-Edge Cornerbead: Use at curved openings.
- D. Interior Trim – Structural Laminate: Provide at all outside corners within 8'-0" of floor surface.
- E. Aluminum Trim: Install in locations indicated on Drawings.
- F. Wall-to-Mullion Sound Seals: Install according to manufacturer's written instructions at 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 other Division 09 Sections.
 3. Level 5:
 - a. Provide at the following locations:
 - 1) At walls perpendicular to exterior glazing.
 - 2) Down Light / Wall Washers
 - 3) Where indicated on Drawings.
 - b. Primer and its application to surfaces are specified in Other Division 09 Sections.

- 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 092900

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SECTION 093000 - TILING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Porcelain tile.
 - 2. Waterproof membrane.
 - 3. Crack isolation membrane.
 - 4. Metal edge strips (093000.A04).
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Section 092900 "Gypsum Board" for cementitious backer units.

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, ANSI A108.17, 108.18, 108.19, 108.20, A118, A136 which are contained in its "Specifications for Installation of Ceramic Tile."
- C. ANSI A 137.1, American National Standard Specifications for Ceramic Tile.
- D. ANSI A 137.2, American National Standard Specifications for Glass Tile.
- E. ANSI A 37.3, American National Standards Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile Panel/Slabs.
- F. Face Size: Actual tile size, excluding spacer lugs.
- G. Module Size: Actual tile size plus joint width indicated.

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 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.60.

1.5 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.

1. Show extent and locations for waterproof membrane and crack isolation membrane.
- 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 lengths.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products.

1.7 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. Tile and Trim Units: Furnish one unopened box, but not more than 2 percent, for each type, composition, color, pattern, and size indicated.

1.8 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one 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 one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
1. Crack isolation membrane.
 2. Joint sealants.
 3. Metal edge strips.
- D. Installer Qualifications:
1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
 3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
- E. 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 wall tile installation.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- F. Mockups/Field Samples: Build mockups/field samples to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups/field samples of each type of **restroom wall tile installation**. Mockup/field sample shall extend to floor to demonstrate transition from wall to floor.

2. Build mockups/field samples of each type of wall tile installation.
3. Approved mockups/field samples may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 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 liquid materials in unopened containers and protected from freezing.
- D. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.10 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 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 1. Level Surfaces: Minimum 0.60.

2.2 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type 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 waterproof membrane and 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. Metal edge strips.

2.3 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.
- D. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.4 TILE PRODUCTS

- A. Tile Types (093000.A01 – **T1**)
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile; “Remedy” glazed porcelain wall tile.
 - a. Comparable products from other manufacturer’s, meeting specified requirements, colors and shape, will be considered when submitted to and accepted by Architect prior to bidding.
 - 2. Composition: Impervious porcelain.
 - 3. Shapes: Refer to Drawings.
 - 4. Sizes: 2-1/4 inch by 9-1/2 inch
 - 5. Thickness: 3/8 inch.
 - 6. Tile Colors and Patterns: As indicated by manufacturer’s designations on Interior Finish Legend.
 - 7. Grout Color: As specified later in this Section.
 - 8. Metal Cove Trim: Provide Schluter; Dilex HKS.
 - 9. Performance Characteristics:
 - a. Water Absorption: ASTM C 373, <0.5%.
 - b. Breaking Strength: ASTM C 648, >275 lbs.
 - c. Scratch Hardness: MOHS, 7.0.
 - d. Chemical Resistance: ASTM C 650, Resistant.

2.5 WATERPROOF MEMBRANE AND CRACK ISOLATION MEMBRANE (093000.A03)

- A. Fluid-Applied Waterproofing/Crack Isolation Membrane: Liquid-latex rubber or elastomeric polymer.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete; “Hydro Ban” waterproofing and crack isolation membrane. Comparable products from other manufacturers will be considered when submitted to and accepted by Architect prior to bidding.
 - 2. Product Description and Characteristics:
 - a. Single component, self-curing liquid rubber polymer that forms a flexible and seamless membrane.
 - 1) Meets ANSI A118.10 - Membranes / Water Proofing and ANSI A118.12 - Membranes / Crack Isolation.
 - b. Thickness: Not less than 0.020 inches when cured.
 - c. Anti-fracture protection up to 1/8 inch.
 - d. Extra Heavy Service rating per TCNA.
 - 3. Adhesives shall have a VOC content of 65 g/L or less.
 - 4. Adhesive shall comply with the testing and product requirements of the California Department of Public Health’s “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.”

2.6 SETTING MATERIALS

- A. Improved Modified Dry-Set Mortar (Thinset and LHT Mortars): ANSI A118.15.
 - 1. Provide prepackaged, dry-mortar mix containing dry, redispersable, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 2. For large & heavy tile (LHT) use mortar meeting LHT requirements.

3. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.15.

2.7 GROUT MATERIALS

- A. Water-Cleanable High Performance Epoxy Grout: ANSI A118.3, with a working time not less than 80 minutes, equipped with anti-microbial technology and a full cure time of 14 days at 70 degrees F, and with a VOC content of 65 g/L or less.
 1. Basis-of-Design Product: LATICRETE International, Inc., "Spectralock PRO Grout" or comparable product from other manufacturers listed below, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
 - a. Ardex.
 - b. Bostik, Inc.
 - c. Custom Building Products.
 - d. MAPEI.
 - e. Mer-Kote Products, Inc.
 - f. Southern Grouts & Mortars, Inc.
 - g. Summitville Tiles, Inc.
 - h. TEC; a subsidiary of H. B. Fuller Company.
 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg. F. and 212 deg. F., respectively, and certified by manufacturer for intended use.
 3. Grout Color: As selected by Architect.

2.8 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. Trowelable Cementitious Coating for Walls: Powdered formulated made from special rapid-setting and hydrating binders, graded silica sand, synthetic resin, and special additives.
 1. Basis of Design Product: Subject to compliance with requirements provide "Ultratop Loft W" by Mapei.
 - a. Technical Data:
 - 1) Consistency: Fine powder.
 - 2) Color: White or Natural.
 - 3) Bulk Density: 900 Kg/m³.
 - 4) Dry solids content: 100%.
 - 5) Mixing ratio: approx. 32-35 parts of water per 100 parts of weight of Ultratop Loft W.
 - 6) Density of mix: 1,600 Kg/m³.
 - 7) PH of mix: 11.
 - b. Finish: In order to protect and make a non-absorbent surface, apply an undercoat of Ultratop Base Coat followed by a finishing product from the Manufacturer's floor finish range and as approved by Architect.
- C. Rapid Set Pre-Tiling Mortar: mortar shall be designed for both interior and exterior use and shall be non-sag type.
 1. Basis-of-Design Product: Ardex; "AM 100 Rapid Set" or comparable product submitted to and accepted by Architect prior to bidding.
 2. Locations for Use: Provide as a ¼ inch thick leveling mortar over interior concrete unit masonry walls indicated to receive tile.
- D. Metal Edge Strips (093000.A04): Profile as specified below, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring and wall applications; white zinc alloy or Type 316 L stainless-steel, ASTM A 666, 300 Series exposed-edge material. Provide Schluter profiles as follows:
 1. **Type TR1:** Schluter; "Jolly" satin anodized aluminum straight-edge profile for the outside vertical edges of tiled surfaces on walls transitioning to another material.
 - a. Size: To be selected from manufacturers full range.
- E. 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.

- F. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.9 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.
 - c. Verify that protruding edges of concrete masonry units have been ground smooth and flush with plane of wall.
 - 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 Architect.
- 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. 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.
- C. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, pre-coat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 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. Tile floors consisting of tiles 8 by 8 inches or larger.
 - c. Tile floors consisting of rib-backed tiles.
- 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 stacked grid pattern, unless otherwise indicated. Lay tile Type **T1** in a straight stacked pattern. 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.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 1. Wall Tile (Tile Type **T1**): 1/16 inch.
- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
 1. Terminate top of wainscot decorative metal edge trim. - TR1 as specified in Section 2.8.D.
- H. All tile terminations that do not end in a corner will be capped with a metal edge trim.
- 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.
 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- 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. Grout Sealer: Apply grout sealer to cementitious grout joints in the wainscot according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

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.
 1. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
 1. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.6 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. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

3.7 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.
 - 1. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- B. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Wall Installations (except wet walls), Metal Studs or Furring:
 - 1. Tile Installation: Thin-set mortar on cementitious backer unit; TCNA W244C-18.
 - a. Tile Type: **T1**
 - b. Thin-Set Mortar: Latex-portland cement mortar.
 - c. Grout: High performance grout.
- B. Interior Wall Installations (Wet Walls), Metal Studs or Furring:
 - 1. Tile Installation: Thin-set mortar on cementitious backer unit; TCNA W244C-18.
 - a. Tile Types: **T1**
 - b. Thin-Set Mortar: Latex-portland cement mortar over liquid waterproofing.
 - c. Grout: Water-cleanable epoxy grout.

END OF SECTION 093000

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Acoustical ceiling panels (095113.A01).
 - 2. Ceiling suspension systems (095113.A02).
 - 3. Edge Molding and Trim (095113.A03).
 - 4. Decorative edge trim for ceilings. (095113.A04).
- B. Related Requirements:
 - 1. Section 012300, "Alternates" for alternates effecting work of this section.
 - 2. Section 095433 "Decorative Ceiling Systems" for linear suspended ceilings.
 - 3. Division 26 Sections for electrical requirements.

1.2 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Panel: One 6 inch square Sample of each type, color, pattern, and texture.
 - 2. Decorative Edge Trim: One 6 inch long Sample of each type, finish, and color. Include splice plate and attachment clip.

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. Suspended ceiling components.
 - 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 including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - 5. Perimeter moldings.
- B. Installer Qualifications: Submit written certification of compliance with requirements.
- C. Qualification Data: For testing agency.
- D. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.
- E. Product test reports.

F. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

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

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Furnish two, unopened boxes of each type installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
3. Hold-Down Clips: Equal to 2 percent of quantity installed.
4. Impact Clips: Equal to 2 percent of quantity installed.
5. Single Tee Adapter Clips: Equal to 2 percent of quantity installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Firm with not less than three years of successful experience in installation of acoustical ceilings similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.

B. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Section 01 31 00.

C. Testing Agency Qualifications: Qualified according to NVLAP.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, 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.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- 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: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANEL CEILINGS, GENERAL

- A. Source Limitations:
 - 1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
 - 2. Suspension System: Obtain each type from single source from single manufacturer.
- B. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- C. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
 - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.
- D. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
 - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- E. Metal Suspension System Standard: Comply with ASTM C 635.

2.3 ACOUSTICAL PANELS (095113.A01)

- A. Recycled Content for Acoustical Panels: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product specified hereinafter or comparable product, meeting specified requirements, by one of the following:
 - 1. Acoustical Ceiling Units:
 - a. Armstrong World Industries, Inc.
 - b. Certaineed, Saint-Gobain.
 - c. USG Interiors, Inc.; Subsidiary of USG Corporation.
 - 2. Metal Suspension Systems, Edge Moldings and Decorative Edge Trim:
 - a. Armstrong World Industries, Inc.
 - b. Certaineed, Saint-Gobain.
 - c. Chicago Metallic Corporation.
 - d. Gordon, Inc.
 - e. USG Interiors, Inc.; Subsidiary of USG Corporation.
- C. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as specified.
- D. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 ACOUSTICAL CEILING PANELS

- A. Acoustical Ceiling Panel, (095113.A01 – **CLG1**): Provide medium textured, square edge lay-in, mineral fiber ceiling panels with the following characteristics:
 - 1. ASTM E 1264 Classification: Type III, Form 2, Pattern C,D.

2. Size: 24" x 48" x 5/8".
 3. Color: White.
 4. Average light reflectance (LR): 0.80.
 5. Noise reduction coefficient (NRC): 0.55, minimum.
 6. Articulation class (AC): 180.
 7. Flame Spread/Fire Resistance: Class A with Fire Guard.
 8. Flame Spread/Fire Resistance: Fire Guard.
 9. Humidity Resistance: HumiGuard+ or comparable from other listed manufacturers.
 10. Product warranty: 30 years.
 11. Suspension grid type: 15/16.
 12. Basis of Design Product: Provide Armstrong "Cortega", #823, or comparable products from manufacturers listed in Article 2.3 of this Section.
- B. Acoustical Ceiling Panel, (095113.A01 – **CLG2**): Provide tegular smooth textured, Square Tegular lay-in, "Wood-look Visuals" ceiling panels with the following characteristics:
1. ASTM E 1264 Classification: Type XII, Form 2, Pattern E.
 2. Size: 24" x 48" x 1".
 3. Color: Honey Oak
 4. Average light reflectance (LR): 0.88.
 5. Noise reduction coefficient (NRC): 0.95, minimum.
 6. Ceiling Attenuation class (AC): 190.
 7. Flame Spread/Fire Resistance: Class A.
 8. Antimicrobial: BioBlock+ or comparable from other listed manufacturers.
 9. Humidity Resistance: HumiGuard+ or comparable from other listed manufacturers.
 10. Product warranty: 30 years.
 11. Suspension grid type: 9/16.
 12. Basis of Design Product: Provide Armstrong "Lyra PB", #8357PBWHO, or comparable products from manufacturers listed in Article 2.3 of this Section.

2.5 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content for Suspension Grid: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.
- B. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. 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 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Post-installed expansion anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so 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, provide not less than 0.106-inch-diameter wire.

- E. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For vestibule and corridor ceilings adjacent to exterior doors, provide hold-down clips spaced 2'-0" o.c. on all cross-tees for a radius of 10 feet from center of door.
- G. Impact Clips: In all toilet provide manufacturer's standard impact clip system design to absorb impact forces against lay-in panels.
- H. Hemmed Edge Molding: Provide prefinished edge molding of profiles indicated. Finish to match adjacent suspension grid.
- I. Fixture Trim: Provide manufacturer's standard fixture trim for fixtures within the 4 by 4 ceiling panels.
 - 1. Color to match suspension trim.

2.6 METAL SUSPENSION SYSTEM (095113.A02)

- A. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Steel cold-rolled sheet, except in kitchen and food preparation areas provide aluminum.
 - 5. Cap Finish: As indicated on Material Finish Legend.
 - 6. Basis of Design:
 - a. Armstrong "Prelude XL" for CLG1, White.
 - b. Armstrong "Suprafine" for CLG2, Color as selected by Architect.

2.7 METAL EDGE MOLDINGS AND TRIM (095113.A03)

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 - 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.8 DECORATIVE METAL EDGE MOLDINGS AND TRIM (095113.A04)

- A. 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 and complying with seismic design requirements and the following:
 - 1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for Alloy and Temper 6063-T5.
 - a. Where indicated on Drawings, curve trim to match approved shop drawings.
 - 2. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 3. Color: As selected by Architect from manufacturer's standard range.
- B. Perimeter Trim:

1. Basis-of-Design Products: Subject to compliance with requirements, provide Armstrong, "Axiom Classic Trim - Straight Model AX6STR" and/or "Axiom Classic Trim - Curved Model AX6CUR" or comparable products by one of the following:
 - a. CertainTeed Corporation.
 - b. Chicago Metallic Corporation.
 - c. Fry Reglet Corporation.
 - d. Gordon, Inc.
 - e. USG Interiors, Inc.; Subsidiary of USG Corporation.
 2. Height: 6 inch
 3. Color: Silver Satin
- C. Reveal Trim (**TR9**):
1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc.; "Axiom Transition Model AXTR7902STR" Shadow Reveal Transition Molding, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Chicago Metallic Corporation.
 - c. Fry Reglet Corporation.
 - d. Gordon, Inc.
 - e. USG Interiors, Inc.; Subsidiary of USG Corporation.

2.9 ACOUSTICAL SEALANT

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
1. Acoustical Sealant for Concealed Joints:
 - a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
 - b. Pecora Corporation; AIS-919.
 - c. Tremco, Inc.; Tremco Acoustical Sealant.
- B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Concealed Joints: Nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant.

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, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- 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 either to structures 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. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - 7. 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.
 - 8. Do not attach hangers to steel deck tabs.
 - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 - 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. 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, and comply with layout shown on reflected ceiling plans.
 - 1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.
- D. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.
- E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. At areas indicated, apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim, unless acceptable to Architect.
- F. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install decorative edge trim at locations and in configurations indicated. Install in accordance with trim manufacturer's written instructions and approved shop drawings.
- H. 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 a neat, precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. 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.
4. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For vestibule ceilings adjacent to exterior doors, provide hold-down clips spaced 2'-0" o.c. on all cross-tees for a radius of 10 feet from center of door.
5. Impact Clips: In all toilet and locker rooms, provide manufacturer's standard impact clip system design to absorb impact forces against lay-in panels.

3.4 CLEANING

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

END OF SECTION 095113

SECTION 095433 - DECORATIVE CEILING SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes the following:
 - 1. Decorative acoustical panels and suspension systems for ceilings (095433.A01).
- B. Section includes strip suspension systems for interior ceilings and walls, and exterior soffits.
- C. Related Requirements:
 - 1. Section 012300 "Alternates" for alternates effecting work of this section.
 - 2. Section 095113 "Acoustical Ceilings" for lay-in acoustical ceilings with exposed suspension systems.
 - 3. Division 26 for lighting connection for decorative tiles and lighting connection.

1.2 DEFINITIONS

- A. LR: Light Reflectance coefficient.
- B. NRC: Noise Reduction Coefficient.

1.3 COORDINATION

- A. Coordinate layout and installation of linear metal pans and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For components with factory-applied color and other decorative finishes.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below:
 - 1. Grille: 12-inch-square module of each type, finish and color.
 - 2. Suspension System Members: 12-inch-long Sample of each type.
 - 3. Exposed Molding and Trim: Set of 12-inch-long Samples of each type, finish, and color.
 - 4. Filler Strips: Set of 12-inch-long Samples of each type, finish, and color.
 - 5. End Cap: Full size.
 - 6. Samples for pre-manufactured wood grille ceiling system and decorative wood ceiling system. Sample shall not be less than 12 inches by 12 inches and shall illustrate wood species, finish, slats with connectors for each grille type.
- D. Delegated-Design Submittal: For design of attachment devices.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans and wall 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. Grille pattern.
 - 2. Joint pattern.
 - 3. Ceiling suspension members.
 - 4. Method of attaching hangers to building structure.
 - 5. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
 - 6. Ceiling perimeter and penetrations through ceiling; trim and moldings.
 - 7. Minimum Drawing Scale: 1/8 inch = 1 foot.
- B. Evaluation Reports: For linear ceiling and components and anchor and fastener type.

1.7 CLOSEOUT SUBMITTALS

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

1.8 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. Wood Grille Ceiling Components: Quantity of each wood grille, carrier, accessory, and exposed molding and trim equal to 2 percent of quantity installed.

1.9 COORDINATION

- A. Coordinate layout and installation of grilles and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.10 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- B. Source Limitations: Obtain each type of infill panel from single manufacturer and same source.
- C. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Class A.
 - 2. Flame-Spread Index: 25 or less.
 - 3. Smoke-Developed Index: 50 or less.
- D. Pre-installation Conference: Conduct conference at Project site.
 - 1. Convene meeting within one week of scheduled start of installation with representatives of the Owner, Construction Manager, Architect, installer, finisher and painter.
 - 2. As applicable, review substrate conditions, requirements for related work, installation instructions, seam finishing, painting instructions, storage and handling, and protection measures.
 - 3. Keep minutes of meeting including responsibilities of various parties.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical ceiling units, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Handle acoustical ceiling units, suspension system components, and accessories carefully to avoid damaging units and finishes in any way.
 - 1. Store infill planks flat and protected from moisture.
- C. Handle wood grilles, suspension system components, and accessories carefully to avoid damaging units and finishes in any way.
 - 1. Store grilles flat and protected from moisture.

1.12 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install interior 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. Building areas to receive ceiling units shall be free of construction dust and debris.
 - 1. Do not install ceiling system until all overhead painting and "wet" work has been completed.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements" to design attachment devices.
- 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: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 450 or less.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

2.2 PRE-MANUFACTURED WOOD SUSPENDED GRILLE SYSTEM (095433.A01 – **CLG3**)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide prefinished suspended wood grille with combination backer and dowel, and metal suspension system from Armstrong, as follows:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong, "Woodworks Grille Tegular" with prefinished wood slats, wood dowel and wood backer. Comparable products from other manufacturers meeting specified requirements and design intent will be considered when submitted to and accepted by Architect prior to bidding.
 - a. Description:
 - 1) Model; Woodworks Grille Tegular Item No. 6723F51L4T5-GGM.
 - 2) Slats and backers shall be fabricated from solid Poplar hardwood.
 - 3) Acoustic Performance Infill: 24 x 24 x 5/8 inch Black matte BioAcoustic infill panels #5823.
 - 4) Flame Spread: : Class "C" ASTM E84.
 - 5) Noise reduction coefficient (NRC): .75, minimum.
 - 6) Slat/Grille Finish: Golden Maple
 - b. Suspension System:
 - 1) Components: All main beams and cross tees shall be commercial quality hot dipped galvanized steel as per ASTM A653. Main beams and cross tees are double-web steel construction with 15/16-inch exposed flange designs.

- (a) Prelude XL 15/16" Exposed Tee 12' Main beam - item 7301BL
 - (b) Prelude XL Exposed Tee 4' Cross Tee - item XL7341BL
 - (c) Prelude XL Exposed Tee 2' Cross Tee - item XL8320BL
- 2) Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- 3) Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least times-three design load, but not less than 12 gauge.
- c. Perimeter Trim: 3/4 inch x 96in x 4 inch solid wood with 4 clips. Same finish as slats. System Weight: Approximately 1.18 lbs/sq ft.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which linear 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 linear ceilings, and as follows:
 - 1. Walls and ceilings to receive cladding system shall be dry, flat and rigid.
 - 2. Vertical alignment (plumbness) of walls shall be within 1/960 (1/8 inch in 10 feet).
 - 3. Horizontal alignment (levelness) of walls and ceilings shall be within 1/960 (1/8 inch in 10 feet).
 - 4. Squareness of walls shall be not more than 1/8 inch out of square within the length of the wall.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width pans at borders, and comply with layout shown on reflected ceiling plans and on Coordination Drawings.
- B. Condition units by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out grilles before installing.
 - 1. Mark plumb lines on substrate at frame joint locations for accurate installation.
 - 2. Locate plank frame and trim accessories to allow clearance at plank edges according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Comply with ASTM C 636/C 636M and seismic requirement indicated, per manufacturer's written instructions and Cisca's "Ceiling Systems Handbook."
- 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 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 either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate to which hangers are attached and for type of hanger involved.

5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that does not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. 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.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers but without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of linear ceiling area and where necessary to conceal edges and ends of linear pans.
1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system carriers so they are aligned and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install hold-down clips where indicated.
- G. Ceiling panels shall be erected plumb, level, square, true-to-line, securely anchored and in proper alignment and relationship to work of other trades.
- H. Cut grilles for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
- I. Install grilles in coordination with suspension system and exposed moldings and trim.
1. Align joints in adjacent modules/courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.
 2. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.
 3. Align grille slats between adjacent sections.
 4. Install end caps.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
1. Suspended ceiling system.
 2. Hangers, anchors, and fasteners.
- B. Ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.5 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch.

3.6 CLEANING AND PROTECTION

- A. Clean exposed surfaces of decorative ceilings, including trim and edge moldings after removing strippable, temporary protective covering if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.
 - 1. Protect ceiling installations from damage by other trades after installation as recommended by ceiling system manufacturer.

END OF SECTION 095433

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resilient base (096513.A01).
 - 2. Resilient molding accessories (096513.A06).
 - 3. Metal transition strips.
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for alternates effecting work of this section.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturers' standard-size Samples, but not less than 12 inches long.

1.3 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 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. 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 or more than 90 deg F.

1.5 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.6 WARRANTY

- A. Special Limited Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace resilient base and accessories that fails within specified warranty period.

1. Material warranty direct from the product manufacture and not a separate or third party insurance provider.
2. Failures include, but are not limited to, the following
 - a. Material manufacturing defects.
 - b. Surface wear and deterioration to the point of wear-through.
 - c. Failure due to substrate moisture exposure not exceeding 5 pounds moisture vapor emission rate when tested according to ASTM F 1869, and 80 percent relative humidity when tested according to ASTM F 2170.
3. Warranty Period:
 - a. For materials: 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE (096513.A01 – **RB1, RB2**)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite; Traditional Wall Base or comparable products, meeting specified requirements, which are submitted to and accepted by Architect prior to bidding.
- B. Product Standard: ASTM F 1861, Type TP (thermoplastic).
 1. Group: I (solid, homogeneous).Cove Base
- C. Product Characteristics:
 1. Thickness: 0.125 inch.
 2. Height: As indicated on drawings.
 3. Lengths: Coils in manufacturer's standard length.
 4. Outside Corners: Pre-formed.
 5. Inside Corners: Job formed.
 6. Colors: Refer to Material Finish Legend for colors.

2.2 RUBBER MOLDING ACCESSORY (096513.A06 - **TR10**)

- A. Description: Stair nosing for resilient flooring.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Tarkett: Johnsonite Stair Nosings - "Profile DTN"
 1. Rubber Stair TreadType: TV, Class 2, (per ASTM F-2169)
 2. Nosing Style: Top Set
 3. Nosing Length: 1 3/4 inch.
 4. Size: Lengths to fit each stair tread in one piece
 5. Color: Black

2.3 METAL TRANSITION STRIPS

- A. Metal Transition Strips: Refer to details on drawings and Sheet A601 for manufacturers and types.
- B. Locations: Provide molding accessories and transitions in areas indicated.
- C. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.4 INSTALLATION MATERIALS

- A. 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.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and suitable for substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less.

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 resilient products.
- 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 manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 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. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 2. Tightly adhere to substrates throughout length of each piece.
 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

3.5 METAL TRANSITION STRIP INSTALLATION

- A. Install metal transition strips where indicated. Securely anchor in place with mechanical fasteners as recommended by transition strip manufacturer.

3.6 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes resilient tile flooring (096519.A01) of the following types:
 - 1. Luxury vinyl floor tile.
- B. Related Sections:
 - 1. Section 012200 "Unit Prices" for unit prices effecting work of this Section.
 - 2. Section 012300 "Alternates" for alternates effecting work of this Section.
 - 3. Section 096513 "Resilient Base and Accessories" for related base and floor transitions.
 - 4. Section 096813 "Tile Carpeting" for related flooring.

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.
 - 1. Floor patterns and transition strip locations.
 - 2. Layout, colors, widths, and dimensions of game lines and markers.
 - 3. Seam locations for sheet flooring.
- C. Samples for Verification: Samples: For each exposed product and for each color and texture specified in manufacturer's standard size, but not less than 6-by-9-inch sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
 - 1. For qualified flooring Installer.
 - 2. For qualified flooring manufacturer.
- B. Preparation and Installation Guidelines: For each type of resilient flooring, including current subfloor preparation guidelines in addition to installation guidelines published by flooring manufacturer.
- C. Slab Moisture Testing Results: Refer to Part 3 of this Section.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.
- B. Warranty:
 - 1. Manufacturer material warranty.
 - 2. Installer installation warranty.

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. Floor Tile: Furnish one un-opened box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. ISO 9001 Certified.
 - 2. ISO 14001 Certified.
 - 3. At least ten years active experience in the manufacture and marketing of indoor resilient flooring.
 - 4. A provider of authorized installer training.
 - 5. Must be competent in techniques required by manufacturer for resilient flooring installation indicated.
- B. 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 and shall have at least five years' experience.
- C. Mockups/Field Samples: Build mockups/field samples to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups/field samples for floor tile including resilient base and accessories.
 - a. Size: Minimum 50 sq. ft. for each type, color, and pattern in locations directed by Architect.
 - 2. Approval of mockups/field samples does not constitute approval of deviations from the Contract Documents contained in mockups/field samples unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Fire Test Characteristics: As determined by testing identical products according to ASTM E 648, Class 1, by a qualified testing agency acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.
- B. 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 or more than 90 deg F. Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

- A. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 1. After post-installation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F or more than 95 deg F.
 - 2. Close spaces to traffic during flooring installation.
 - 3. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.
- B. Install floor tile after other finishing operations, including painting, have been completed.

1.9 WARRANTY

- A. Special Limited Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace resilient flooring that fails within specified warranty period.
 - 1. Material warranty direct from the product manufacture and not a separate or third party insurance provider.
 - 2. Failures include, but are not limited to, the following
 - a. Material manufacturing defects.
 - b. Surface wear and deterioration to the point of wear-through.

- c. Failure due to substrate moisture exposure not exceeding 5 pounds moisture vapor emission rate when tested according to ASTM F 1869, and 80 percent relative humidity when tested according to ASTM F 2170.
- 3. Warranty Period:
 - a. For materials: 2 years from date of Substantial Completion.
 - b. For surface wear: 15 years from date of Substantial Completion.
- B. Special Limited Warranty: Installer's standard form in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within the specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

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 LUXURY VINYL FLOOR TILE (096519.A01 – **RF1**)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Event*, Wood" by Tarkett. Comparable products from other manufacturers will be considered, which match color and pattern selected to Architect's satisfaction and, are submitted to and accepted by Architect prior to bidding.
 - 1. Tile Standard: ASTM F 1700.
 - a. Class: Class III, Type B
 - 2. Product Characteristics:
 - a. Thickness: 3.0 mm.
 - 1) Wear layer thickness 30 mil.
 - b. Edge: Square Edge
 - c. Style: Standard Embossed.
 - d. Size: 6 inch x 48 inch.
 - 3. Performance Characteristics:
 - a. Static Load Limit: Passes, modified at 250 psi when tested according to ASTM F 970.
 - 4. Colors: As indicated by manufacturer's designations on Material Color Schedule.
 - 5. Installation Pattern: Unidirectional.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by tile flooring and adhesive manufacturers for each type of tile flooring. Adhesive shall be suitable for substrate conditions involved and compatible with flooring.
- C. Topical Concrete Vapor Sealer: Liquid penetrating type or film-forming type, designed to seal concrete and inhibit moisture transmission through slab. Concrete vapor sealers shall be as recommended by resilient tile flooring contractor based upon successful previous installations and as acceptable to resilient tile flooring manufacturer. Refer to Section 012200 "Unit Prices".
- D. Metal Transition Strips: Refer to details on drawings and Sheet A601 for manufacturers and types.
 - 1. Locations: Provide molding accessories and transitions in areas indicated.
 - 2. Colors and Patterns: As selected by Architect from manufacturer's full range.

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.

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 carpet tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by carpet 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 9 pH.
 - 4. Moisture Testing (Contractor's Option):
 - a. Perform 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. in 24 hours, unless a higher rate is accepted by flooring manufacturer in writing.
 - 1) Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
 - b. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement, unless a higher rate is acceptable to flooring manufacturer.
- C. Concrete Vapor Sealer Application: Prepare surfaces to receive concrete vapor sealer and apply concrete vapor sealer in strict accordance with vapor sealer manufacturer's written instructions to suit slab moisture conditions encountered.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate according to manufacturer's written instructions.
 - 1. Fill cracks 1/8 inch wide and wider, fill and level holes and depressions 1/4 wide or wider and grind level all protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- E. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
- F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- 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, unless specifically indicated otherwise.

- 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.
 - 1. Lay luxury vinyl tiles with grain running in one direction.
- 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 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
 - 1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.
- D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

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SECTION 096723 - RESINOUS FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes seamless resinous flooring systems (096723.A01) with integral base (096723.A02).
- B. Related Sections:
 - 1. Section 012200 "Unit Prices" for waterproofing membrane.
 - 2. Section 012300 "Alternates" for those alternates affecting work of this Section.
 - 3. Section 096513 "Resilient Base and Accessories".

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.
 - d. Review layout and patterns.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required; in addition to the following:
 - 1. List each material and cross-reference the specific coating, finish system and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Laboratory Test Reports: For resinous flooring systems, documentation indicating that products comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers".
- B. Samples for Verification: Prior to beginning work, submit samples for each resinous flooring system color, texture and sheen required and as follows:
 - 1. Samples shall be 6 inches square, applied to a rigid backing by Installer for this Project.
 - 2. Resubmit samples as requested until required sheen, color and texture is acceptable to Architect.

1.4 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Submit certificates signed by manufacturer certifying that installers comply with specified requirements, in addition to the following:
 - 1. Submit substantiating evidence of experience installing the specific brand of products proposed in similar areas, in addition to meeting Installer Qualification criteria.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an Installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated. Installer shall be/have been trained by flooring system manufacturer with experience in application and installation of systems similar in complexity to those required for this project, in addition to the following:
 - 1. Installer shall have a minimum of two (2) years continuous experience under the current company name.
 - 2. Installer shall submit a reference list of at least three (3) projects, similar in size and applied system(s), completed in the State of Missouri Include contact information for General Contractor or Construction Manager and Owner. List types and names of systems installed, each material/component of system(s) installed, quantity installed and dates completed.
- B. Mockups/Field Samples: Build mockups/field samples to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups/field samples in conjunction with the wall tile mock-up installation. Mockup/field sample shall extend to floor to demonstrate transition from wall to floor.
 - 2. Approved mockups/field samples may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components. Include handling instructions and precautions.
- B. Store materials not in actual use in tightly covered containers at a minimum ambient temperature of 45 deg F in a well-ventilated area. Maintain containers in clean condition, free from foreign material and residue.
 - 1. Protect liquid components from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary precautionary measures to ensure workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of floor systems.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
 - 1. Do not commence work until the building can be maintained at a temperature range between 60 deg F and 90 deg F for 48 hours before, during and 48 hours after application. Broom clean areas (reasonably dust free) and have adequate controlled ventilation.
 - 2. Maintain ventilation in each area indicated to receive resinous flooring until completion of the resinous flooring work in that area.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.
- D. Surfaces to receive resinous flooring must be acceptable and in accordance with flooring system manufacturer's recommendations.
 - 1. Provide clean, dry, and neutral substrate for resinous flooring application.
 - 2. Notify Owner's Representative in writing of unsuitable surfaces and conditions. Commencement of work implies acceptance of surfaces and working conditions.

1.9 PROTECTION

- A. Protect adjacent surfaces from damage resulting from work of this trade. If necessary, mask and/or cover adjacent surfaces, fixtures, cabinetry, equipment, etc. by suitable means.
- B. Post "NO SMOKING" signs while work is in progress and during curing.

1.10 SPECIAL WARRANTY

- A. Contractor, manufacturer and installer have responsibility for an extended corrective period for work of this Section for a period of three (3) years from date of Substantial Completion against all conditions indicated below, and when notified in writing by Owner, Contractor/manufacturer/installer shall promptly and without inconvenience and cost to the Owner, correct said deficiencies in compliance with the requirements of the Conditions of the Contract.
 - 1. Flooring system manufacturer and Installer shall co-sign warranty and shall be responsible for:
 - a. Bond failure of system(s) to substrate.
 - b. System yellowing, including regionalized discoloration.
 - c. Excessive wear.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Flammability: Self-extinguishing according to ASTM D 635.
- C. Slip Resistance: Resinous flooring surfaces shall have the following minimum performance requirements as indicated below.
 - 1. Static Dry Coefficient of Friction: 0.6 minimum per ASTM D2047.
 - 2. Dynamic Wet Coefficient of Friction: 0.45 minimum per ANSI A326.3 or ANSI B101.3.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, body coats, and topcoats, from single source from single manufacturer to ensure material compatibility, chemical and mechanical bond; quality of materials, color and pattern consistency. Obtain secondary materials, including patching and fill material, color chips/flakes and granules, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.3 RESINOUS FLOORING (096723.A01 – FT1)

- A. Basis-of-Design Product: Subject to compliance with specified requirements, provide Dur-A-Flex; "DUR-A-CHIP" with aliphatic urethane topcoat DESCO Coatings, Inc.; "Granite Series" with aliphatic urethane topcoat resinous flooring system. Comparable products from manufacturers listed below and other manufacturers which meet or exceed specified requirements will also be considered when submitted to and accepted by Architect as a substitution prior to bidding only.
 - 1. DESCO Coatings, Inc.; "Granite Series" with aliphatic urethane topcoat
 - 2. Stonhard; "Stonetec ERF" with aliphatic urethane topcoat.
 - 3. Sherwin-Williams Resufloor Deco Flake DB with aliphatic urethane topcoat.
 - 4. Tnemec; Series 224 "DECO-Fleck" with aliphatic urethane topcoat.

5. Comparable products from manufacturers listed below and other manufacturers which meet or exceed specified requirements will also be considered when submitted to and accepted by Architect as a substitution prior to bidding only.
 - a. Stonhard.
- B. Resinous Flooring System: Abrasion-, impact-, UV-, and chemical-resistant, flake-aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor.
- C. System Characteristics:
 1. Color and Pattern: As indicated by mix designs on Drawings.
 2. Wearing Surface: Orange-peel texture to match approved sample.
 - a. Slip resistance shall not be less than performance requirements indicated in this Section.
 3. Overall System Thickness: Not less than 1/16-inch (62.5 mils), excluding primer thickness.
- D. Primer: Provide manufacturer's recommended primer to suit substrate and resinous flooring system indicated.
 1. Formulation Description: 100 percent solids.
- E. Body and Grout Coats:
 1. Resin: Epoxy.
 2. Formulation Description: 100 percent solids.
 3. Type: Clear or colored.
 4. Application Method: Self-leveling slurry with broadcast aggregates. Aggregates shall be broadcast to rejection.
 5. Number of Coats: As required to achieve overall system thickness specified.
 6. Aggregates: Manufacturer's standard vinyl flakes.
 - a. Flake aggregates shall be available in at least two sizes. Refer to mix design for colors and sizes.
 - b. There will be one base color aggregate and up to five accent colors selected by the Architect.
- F. Topcoats: Sealing or finish coats.
 1. Resin: Aliphatic urethane.
 2. Formulation Description: High solids.
 3. Type: Clear.
 4. Number of Coats: As required to achieve overall system thickness specified.
 5. Thickness of Coats: Not less than 6 mils.
 6. Finish: Matte/satin.
- G. Integral Cove Base: Provide integral coved base of height indicated with 1 inch radiused cove and top edge terminated into raked joint in masonry. Where wall substrate is not masonry, terminate top edge in zinc or stainless steel edge strip. Provide keyed joint where resinous flooring terminates with other materials.
- H. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
 1. Compressive Strength: 10,000 psi minimum according to ASTM C 579.
 2. Compressive Strength: 16,000 psi minimum according to ASTM D 695.
 3. Tensile Strength: 1,600 psi minimum according to ASTM C 307.
 4. Flexural Modulus of Elasticity: 3,900 minimum according to ASTM C 580.
 5. Water Absorption: 0.04 percent maximum according to ASTM C 413 or ASTM D 570.
 6. Bond Strength (to concrete): 400 psi minimum according to ASTM D 2240, substrate fails.
 7. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch permanent indentation according to MIL-D-3134J.
 8. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch according to MIL-D-3134J.
 9. Abrasion Resistance: 0.24 mg maximum weight loss according to ASTM C 501.
 10. Hardness: 75 - 80, Shore D according to ASTM D 2240.
 11. Flammability: Self extinguishing according to ASTM D 635.
 12. Flame Spread/NFPA-101: Class A according to ASTM E 84.
- I. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested according to ASTM D 1308 for 50 percent immersion in the following reagents for no fewer than seven days:
 1. Hydrochloric Acid (20%).
 2. Urine.
 3. Coffee.
 4. Ethyl Alcohol.

5. Iodine.
6. Lactic Acid (10%).
7. Tea.
8. Mustard.
9. Mercurochrome.
10. Betadyne.

2.4 ACCESSORIES

- A. Reinforcing Membrane: Flexible resin formulation that is recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated and that inhibits substrate cracks from reflecting through resinous flooring.
 1. Formulation Description: Manufacturer's standard high solids.
 - a. Provide fiberglass scrim embedded in reinforcing membrane.
- B. Metal Transition Strips: Refer to details on drawings and Sheet A601 for manufacturers and types.
 1. Locations: Provide molding accessories and transitions in areas indicated.
 2. Colors and Patterns: As selected by Architect from manufacturer's full range.
- C. At top of resinous wall base provide the following product. Colors shall match existing at project site as determined by Architect. Height of trim shall match thickness of resinous flooring system.
 1. Basis of Design Product: "Jolly" by Schluter.
- D. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- E. Joint Sealant: Type recommended or produced by manufacturer of resinous flooring system for type of service and joint condition indicated.
- F. Waterproofing Membrane: When required by manufacturer for a successful installation over project site conditions, provide and install a fluid applied moisture barrier membrane, to prevent excessive moisture/humidity conditions, allowing a fully warranted floor installation.
 1. Vapor barrier to allow 100% relative humidity at the floor surface, while maintaining the manufacturer's full warranty.
 2. Refer to Section 012200 "Unit Prices".

PART 3 EXECUTION

3.1 EXAMINATION

- A. Contractor shall examine subfloor surfaces to verify all substrates and conditions are satisfactory. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, curing compounds, and other adhesives and coatings that may inhibit bonding capability of resinous flooring and primer, as well as other defects that may impair performance and appearance.

3.2 PREPARATION

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
 1. Areas where flooring is existing, must be cleaned to remove all floor material, adhesives, grease or any residue that may interfere with interfacial adhesion between substrate and new resinous flooring system.
 2. Prepare concrete substrates by shot blasting or grinding to achieve surface profile recommended by resinous flooring manufacturer.
 3. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, adhesives, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 - 1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
 - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
 - 3. Moisture testing is not required. However, Contractors at their own expense may, as they deem necessary, verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
 - b. Relative Humidity Test: Use in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement.
 - 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
 - 1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- E. Metal Transition Strips: Install at locations indicated and between resinous flooring and other flooring materials.. Thicken resinous flooring application as necessary to meet requirements of transition strip. Installation shall be in strict accordance with edging manufacturer's written recommendations.

3.3 APPLICATION

- A. Proceed with resinous flooring work after subfloor surfaces are satisfactory. Commencement of resinous flooring work is construed as Installer's acceptance of substrate surfaces within a particular area.
 - 1. Coordinate work within this section with adjacent finish work to achieve full coverage of each finish as required by each section.
- B. Apply components of resinous flooring system according to manufacturer's latest written instructions, employing technically-trained, approved mechanics, to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
 - a. Do not fill moving isolation joints or expansion joints.
 - b. At movement joints, provide membrane isolation strips and reinforcing tape as recommended by resinous flooring manufacturer.
- C. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- D. Reinforcing Membrane: Apply reinforcing membrane to substrate cracks.
 - 1. Fill non-moving control joints with approved elastomeric sealant or full-depth semi-rigid two-component epoxy joint filler, designed specifically for this purpose (use full-depth semi-rigid joint filler when reinforcement of the joint edge is desirable), or two-component epoxy and filler (epoxy to be same material as flooring).

- E. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.
- F. Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.
- G. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.
- H. Cure resinous flooring in compliance with flooring manufacturer's directions to prevent contamination during all stages of application.
- I. Finish work shall match approved samples; be uniform in thickness, sheen, color and texture; and be free of defects detrimental to appearance and performance.
- J. Install metal transition strips where resinous flooring abuts other flooring materials. Securely anchor in place with mechanical fasteners as recommended by transition strip manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Material Sampling: Owner's Representative may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.
- B. Core Sampling: At the direction of Owner's Representative and at locations designated by Owner's Representative, take one core sample per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.
- C. Touch-up or repair damaged coatings. Touch-up shall not be visibly different. Recoat entire surface if touch-up results are visible, either in sheen, texture or color.

3.5 CLEANING AND PROTECTION

- A. Clean resinous flooring prior to Substantial Completion. Use materials and procedures recommended by resinous flooring manufacturer.
- B. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.
 - 1. Remove any temporary covering prior to cleaning and final inspection.

END OF SECTION 096723

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SECTION 096813 - TILE CARPETING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile (096813.A01).
- B. Related Requirements:
 - 1. Section 012200 "Unit Prices" for waterproofing membrane.
 - 2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 PRE-INSTALLATION MEETINGS

- A. Pre-installation 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.
 - d. Review carpet tile layout and patterns.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Type of substrate to receive tile carpeting.
 - 3. Type of installation.
 - 4. Pattern of installation.
 - 5. Pattern type, location, and direction.
 - 6. Carpet tile type, color and dye lot.
 - 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 Verification: 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.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- E. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. 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: Furnish one un-opened box of each carpet tile type, color and pattern for every 5 percent of amount installed.

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/Field Samples: Build mockups/field samples to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockups/field samples for carpet tile including accessories.
 - a. Size: Minimum 50 sq. ft. for each type, color, and pattern in locations directed by Architect.
 - 2. Approval of mockups/field samples does not constitute approval of deviations from the Contract Documents contained in mockups/field samples unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

1.9 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 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 occupancy levels 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, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 CARPET TILE (096813.A01)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products specified on drawings or a comparable products meeting specified requirements, having similar colors and patterns as acceptable to Architect with the following characteristics submitted to and accepted by Architect prior to bidding.
 1. Refer to Material Finish Legend for carpet selections including name, manufacturer, and installation pattern.
- B. Carpet Type **C1**: Subject to compliance with requirements, provide "Open Air" #404" by Interface
 1. Product No. 1633302500
 2. Product Construction: Tufted Textured Loop.
 3. Fiber Type: 100 percent Recycled Content Type 6 Nylon.
 4. Dye Method: 100% Solution Dyed
 5. Face Weight: 19 oz/yd².
 6. Pile Thickness: 0.07 inches.
 7. Pile Density: 9,771 oz/yd³.
 8. Stitches: 8.30 per inch.
 9. Size: 19.69 inch by 19.69 inch
 10. Radiant Panel: ASTM E-648 Class 1.
 11. Smoke Density: ASTM E-662 ≤ 450.
 12. Primary Backing: Synthetic – GlasBac RE.
 13. Soil / Stain Protection: Manufacturer's standard with warranty.
 14. Color and Pattern: As indicated on Material Finish Legend.
 15. Installation Method: Non-Directional
- C. Carpet Type **C2**: Subject to compliance with requirements, provide "Open Air" #410" by Interface
 1. Product No. 163400AK00
 2. Product Construction: Tufted Textured Loop.
 3. Fiber Type: 100 percent Recycled Content Type 6 Nylon.
 4. Dye Method: 100% Solution Dyed
 5. Face Weight: 18 oz/yd².
 6. Pile Thickness: 0.09 inches.
 7. Pile Density: 6,968 oz/yd³.
 8. Stitches: 8.30 per inch.
 9. Size: 9.85 inch by 39.38 inch
 10. Radiant Panel: ASTM E-648 Class 1.
 11. Smoke Density: ASTM E-662 ≤ 450.
 12. Primary Backing: Synthetic – GlasBac RE.
 13. Soil / Stain Protection: Manufacturer's standard with warranty.
 14. Color and Pattern: As indicated on Material Finish Legend.
 15. Installation Method: Ashlar

2.2 WALK-OFF CARPET TILE (096813.A01)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products specified on drawings or a comparable products meeting specified requirements, having similar colors and patterns as acceptable to Architect with the following characteristics submitted to and accepted by Architect prior to bidding.
 1. Refer to Material Finish Legend for carpet selections including name, manufacturer, and installation pattern.
- B. Carpet Type **C3**: Subject to compliance with requirements, provide "Step Repeat" #SR999" by Interface
 1. Product No. 1388702500
 2. Product Construction: Tufted Textured Loop.
 3. Fiber Type: 100 percent Recycled Content Type 6 Nylon.

4. Dye Method: 100% Solution Dyed
5. Face Weight: 26 oz/yd².
6. Pile Thickness: 0.13 inches.
7. Pile Density: 7,654 oz/yd³.
8. Stiches: 10 per inch.
9. Size: 19.69 inch by 19.69 inch
10. Radiant Panel: ASTM E-648 Class 1.
11. Smoke Density: ASTM E-662 ≤ 450.
12. Primary Backing: Synthetic – GlasBac RE.
13. Soil / Stain Protection: Manufacturer's standard with warranty.
14. Color and Pattern: As indicated on Material Finish Legend.
15. Installation Method: As indicated on Material Finish Legend.

2.3 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, non-staining, pressure-sensitive type. Select adhesives suitable for substrate conditions and compatible with flooring and backing. Adhesives shall comply with flammability requirements for installed carpet tile and be recommended by carpet tile manufacturer for releasable installation.
 1. Adhesives shall have a VOC content of 50 g/L or less.
 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Adhesive Tape: Tile Carpeting manufacturer's recommended adhesive tape to suit backing type and substrates involved.
 1. Basis-of-Design Product: "TacTiles:."
- D. Resilient Transition Strips: Refer to Section 096513 "Resilient Base and Accessories" and Interior Material Finish Legend for information and products for use at carpet transitions.
- E. Metal Transition Strips: Refer to details on drawings and Sheet A601 for manufacturers and types.
 1. Locations: Provide molding accessories and transitions in areas indicated.
 2. Colors and Patterns: As selected by Architect from manufacturer's full range.
- F. Topical Concrete Vapor Sealer: Liquid penetrating type or film-forming type, designed to seal concrete and inhibit moisture transmission through slab. Concrete vapor sealers shall be as recommended by tile carpeting Contractor based upon successful previous installations and as acceptable to tile carpeting manufacturer.
 1. Refer to Section 012200 "Unit Prices".
 2. Basis of Design Product: Subject to compliance with requirements, provide "Vaporseal HM Plus" by Dependable Floor Products, or a comparable product acceptable to Architect and carpet tile manufacturer, with the following product characteristics:
 - a. Permeance: Less than 0.1 perms when applied at 11 mills (dry film thickness) per ASTM E96.
 - b. Moisture Barrier for slabs up to 100 percent relative humidity per ASTM F2170 and/or 25 pounds MVER per ASTM 1869.

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. Examine carpet tile for type, color, pattern, and potential defects.
- B. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- 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 wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. 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 carpet tile manufacturer.
- D. 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 carpet tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by carpet 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 9 pH.
 - 4. Moisture Testing of Existing Slabs:
 - a. Perform 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. in 24 hours, unless a higher rate is accepted by flooring manufacturer in writing.
 - 1) Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
 - b. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement, unless a higher rate is acceptable to flooring manufacturer.
- E. Concrete Vapor Sealer Application: When concrete vapor sealer is required, prepare surfaces to receive concrete vapor sealer and apply concrete vapor sealer in strict accordance with vapor sealer manufacturer's written instructions to suit slab moisture conditions encountered.
 - 1. Concrete vapor sealer shall be applied as base bid for installation of carpet over existing concrete slabs.
- F. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. Installation: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method:
 - 1. Refer to manufacturer recommended installation guidelines for each product.
 - 2. At perimeter of each room/area: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
 - 3. In field of room/area (inside glued down perimeter): install tiles with manufacturer's adhesive connectors.
- C. Installation Layout: As indicated on Material Finish Legend.
- D. Maintain dye lot integrity. Do not mix dye lots in same area.
- E. 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.

- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- H. Install pattern parallel to walls and borders.
- I. Metal Transition Strips: Install at locations indicated and between carpet tile and adjacent finishes. Installation shall be in strict accordance with edging manufacturer's written recommendations.

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 096813

SECTION 097700 - SPECIAL WALL FINISH SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes the following types of pre-engineered architectural wall cladding systems:
 - 1. Modular wall panel system incorporating various panel types into an aluminum framing system (097700.A01 – WP1, WP2, WP3).
- B. Related Sections:
 - 1. Section 061000 "Rough Carpentry" for wood furring for installing paneling.
 - 2. Section 064023 "Interior Architectural Woodwork" for interior trim and molding.

1.2 REFERENCES

- A. American Society for Testing and Materials: Standard Specifications (ASTM):
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM D256; Impact Resistance of Plastics and Electrical Insulating Materials.
 - 3. ASTM D570; Water Absorption of Plastics.
 - 4. ASTM D638; Tensile Properties of Plastics.
 - 5. ASTM D696; Coefficient of Linear Thermal Expansion of Plastics.
 - 6. ASTM D790; Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 7. ASTM D2583; Indentation Hardness of Rigid Plastics by Means of a Barcol Impresser.
- B. Architectural Woodwork Standards as published by the Architectural Woodwork Institute, the Architectural Woodwork Manufacturers Association of Canada, and the Woodwork Institute.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, in addition to specifications, preparation, and installation instructions.
- B. Shop Drawings: Submit complete shop drawings indicating elevations of each wall, quantities, finishes, dimensions, and attachment relationships for each wall finish system installation. Clearly differentiate each panel type within the system, in addition to indicating panel color, texture, pattern, and orientation of texture/pattern.
 - 1. Clearly indicate dimensions of each special wall finish system, each panel and note location in project.
 - 2. Submit shop drawings showing seams, termination points, and details of edges. Coordinate electrical and plumbing work on shop drawings.
- C. Samples for Initial Selection: For color and finish samples for framing trim and each type of panel finish.
- D. Samples for Verification: For each type of panel and panel system, in manufacturer's standard sizes, but not less than the following:
 - 1. Samples for architectural wall cladding system in aluminum frame, sample shall not be less than 2 feet square. Sample shall illustrate colors and finishes, showing texture range, and consistency of color and finish for each panel type. Sample shall incorporate each type of panel specified and trim along two sides of sample.

1.4 QUALITY ASSURANCE

- A. Manufacturers: Manufacturer for architectural wall cladding system shall have a minimum of five years' experience in manufacturing architectural materials. Single source supplied, wall cladding system consisting of factory mitered and welded framing assemblies and specified infill panels.

- B. Installer Qualifications: Same as manufacturer or approved by manufacturer in writing.
- C. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. ASTM E 84 (Method of test for surface burning characteristics of building Materials) for Class C.
- D. Preinstallation Conference: Conduct conference at Project site.
 - 1. Convene meeting within one week of scheduled start of installation with representatives of the Owner, Construction Manager, Architect, installer, finisher, and painter.
 - 2. As applicable, review substrate conditions, requirements for related work, installation instructions, seam finishing, painting instructions, storage and handling, and protection measures.
 - 3. Keep minutes of meeting including responsibilities of various parties.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight 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 DELIVERY, STORAGE AND HANDLING

- A. Deliver components in clearly marked containers and packages suitable for shipment of specified products so as to prevent damage during transit.
- B. Store components in secured areas with ambient environmental conditions of 25 to 55 percent relative humidity and temperature not to exceed 80 degrees. Store in dry locations that will avoid damage. Do not stack panels directly on floor and do not subject panels to moisture.
- C. Handle panels and components to avoid racking, twisting, denting, scratching of finished surfaces.
 - 1. Store panels flat and protected from moisture.

PART 2 PRODUCTS

2.1 ARCHITECTURAL WALL CLADDING SYSTEM (097700.A01 – **WP1, WP2, WP3**)

- A. General: Wall cladding system shall be a non-progressive wall cladding system, consisting of, but not be limited to: infill panels; pre-engineered, aluminum framing components, trims, terminations, miscellaneous metal, sub-frames, clips, fasteners, and other devices to secure anchorage of panels to conventional substrates. Panels shall be point-accessible and able to be installed and removed in a non-progressive manner. System shall also include various infill panels as specified in this Section and as provided by the wall cladding system manufacturer. All components for the system shall be factory-fabricated to the best extent possible.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide **Fry Reglet Corporation, "Graph Modular Wall System"** architectural wall cladding system or comparable product from other manufacturers, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
- B. Materials:
 - 1. Framing and Trim Components: All aluminum components, except framing, shall be fabricated from extruded 6063 T5 aluminum. Framing components shall be fabricated from extruded 6463-T5 aluminum.
 - a. Finishes:
 - 1) Clear Anodized: Manufacturer's standard anodized finish Architectural 200R1 medium etch (AA-M32c10A21), clear color.
 - 2) Factory powder coated, black.
 - b. Trim Types:
 - 1) Single Fin Reveal: Provide manufacturer's standard trim profile.
 - 2) Shadow Fin Reveal: Provide manufacturer's standard trim profile.
 - c. Corner Trim:
 - 1) Low Profile Outside Corner: Provide manufacturer's standard trim profile.

- 2) Inside Corner: Provide manufacturer's standard trim profile.
- d. Base: As fabricated by wall cladding system manufacturer. Fabricate base from 14 gauge (0.064 inch) thick aluminum of alloy and temper recommended by fabricator.
- 2. Infill Panels: Plastic-laminated-clad panels.
 - a. Panel Core: ¾ inch thick, fire retardant, medium-density fiberboard with no added urea-formaldehyde (NAUF). Medium-density fiberboard shall comply with ANSI A208.2, fire-retardant, 48# minimum density, having an internal bond strength of 120 psi and meeting Class A requirements.
 - b. Plastic Laminate: Refer to Material Finish Legend for colors, textures, patterns and sheen.
 - c. Panel edges when used with shadow fin reveal trim shall be painted flat black.
 - d. Panel shall have a balanced backer sheet.
- C. Fabrication:
 - 1. Frame Fabrication: Aluminum framing components shall be factory mitered and welded to form subassemblies including 2-way, 3-way and 4-way intersections, inside and outside corners and custom intersections as detailed in manufacturer's approved shop drawings. Wall cladding system shall be capable of providing either a fineline joint or a ¼ inch reveal joint, with an anodized aluminum exposed element bordering each infill panel horizontally, vertically or in both directions as indicated on the Contract Documents. All other details, including base, head, corners, intersections, etc. shall be fabricated in accordance with the Drawings.
 - 2. Infill Panels: Panels shall be installed in a non-progressive manner and must be point accessible. Panels shall be affixed to framework with co-extruded clips having an independent lab certification pullout loading of 10 pounds per inch of attachment.

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, and as follows:
 - 1. Walls to receive cladding system shall be dry, flat and rigid.
 - 2. Vertical alignment (plumbness) of walls shall be within 1/960 (1/8 inch in 10 feet).
 - 3. Horizontal alignment (levelness) of walls shall be within 1/960 (1/8 inch in 10 feet).
 - 4. Squareness of walls shall be not more than 1/8 inch out of square within the length of the wall.
 - 5. Verify that a vapor barrier has been provided on exterior walls behind backing to prevent warping.
 - 6. Verify backing and mounting surfaces are smooth, solid, and flat. All drywall joints are to be taped and finished.
 - 7. Verify that walls are sealed, primed, and painted before installation begins.
 - 8. Verify mechanical, electrical, and building service and/or items affecting work of this section are placed and ready to receive this work.
 - 9. Wall panels shall be erected plumb, level, square, true-to-line, securely anchored and in proper alignment and relationship to work of other trades. If adjacent work by other trades is out of plumb the tolerances must be corrected prior to proceeding.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Verify dimensions of wall panels prior to installation to assure compatibility with job-site conditions.
- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling and each type of infill panel before installing.
 - 1. Mark plumb lines on substrate at frame joint locations for accurate installation.
 - 2. Locate panel frame and trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.3 PRE-MANUFACTURED DECORATIVE WOOD WALL PANELS

- A. Install each system, including frame and grid components, panels and accessories according to manufacturer's written instructions and approved shop drawings.
 - 1. Grid components shall be plumb, true and level.
 - 2. Wall panels shall be erected plumb, level, square, true-to-line, securely anchored and in proper alignment and relationship to work of other trades.
- B. Fasten supports and trim using appropriate fasteners into a stud or other solid substrate at centers as specified by the manufacturer. Where screws do not hit the studs, fasten with adhesive in accordance with the manufacturer's recommendations. Pre-drill holes thru the members and fasten the screw flush with the flange on the aluminum profile. Where necessary countersink for the screw head to seat flush with the flange.
- C. All panels with wood substrate must be allowed to acclimate to the project environmental conditions prior to installation.
- D. Avoid contamination of the panel faces with adhesives, solvents or cleaners during installation.

3.4 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch.

3.5 CLEANING AND PROTECTION

- A. Visually inspect all exposed surfaces for scratches and blemishes. Remove adhesives, sealants and other stains per manufacturers written instructions.
- B. Protect special wall finishes from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- C. Cover special wall finishes until Substantial Completion.

END OF SECTION 097700

SECTION 099113 - 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. Steel and iron.
 - 2. Galvanized metal.
 - 3. Aluminum (not anodized or otherwise coated).
 - 4. Steel doors and frames.
 - 5. Miscellaneous mechanical, electrical, plumbing, fire suppression, communication and technology work as delineated in this section.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
 - 2. Section 012200 "Unit Prices" for unit prices affecting work of this Section.
 - 3. Section 012300 "Alternates" for those alternates related to work of this Section.
 - 4. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
 - 5. Section 099123 "Interior painting" for surface preparation and the application of paint systems on interior substrates.
 - 6. Section 099600 "High-Performance Coatings" for special-use coatings.

1.2 DEFINITIONS

- A. Gloss Level 1 "Matte": Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 3 "Eggshell": 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 4 "Satin-like": 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 5 "Semi-gloss": 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. Gloss Level 6 "Gloss": 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 7 "High Gloss": 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. Indicate VOC content.
- B. Samples for Initial Selection: Where colors are not indicated on Drawings, submit 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, 6 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 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 that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: One (1) gallon 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 paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers - Basis of Design Products: Subject to compliance with requirements, provide products The Sherwin-Williams Company, or comparable products listed below:
 - 1. Benjamin Moore & Co.
 - 2. Glidden Professional.
 - 3. PPG Paints.
 - 4. Benjamin Moore & Co.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: Where not indicated on Drawings, as selected by Architect from manufacturer's full range.
 - 1. Twenty percent of surface area will be painted with deep tones.
- C. Paint Systems: Refer to schedule at end of this Section.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner may 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. Exterior 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 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 encapsulant.
 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, but not less than the following:
 1. SSPC-SP 3.
- 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. Aluminum Substrates: Remove loose surface oxidation.
- J. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- K. Fiber-cement and cellular PVC Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

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. Miscellaneous Painting of Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - 1) Also includes gas lines on roof.
 - c. Uninsulated plastic piping.
 - 1) Also includes PVC condensate lines on roof.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.

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 Traffic Surface:
 - 1. The Sherwin-Williams Company.
 - a. First Coat: Conflex Flexible Concrete Waterproofer, A5 Series (Textured or Smooth)
 - b. Second Coat: Conflex Flexible Concrete Waterproofer, A5 Series (Textured or Smooth)
 - 1) at 10-12 mils wet per coat.
- B. Concrete Pedestrian Traffic Surface:
 - 1. The Sherwin-Williams Company.
 - a. First Coat: Floor paint, latex, low gloss: ArmorSeal Tread-Plex, B90 Series.
 - 1) at 1.5-2.0 mils dry per coat.
 - b. Topcoat: Floor paint, latex, low gloss ArmorSeal Tread-Plex, B90 Series
 - 1) at 1.5-2.0 mils dry per coat.
- C. Concrete, including structural precast:
 - 1. The Sherwin-Williams Company.
 - a. Prime Coat: Loxon Concrete & Masonry Primer Sealer, LX02W50.
 - 1) at 8.0 mils wet, 3.2 mils dry.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: A-100 Exterior Latex Satin, A82 Series, satin.
 - 1) at 4.0 mils wet, 1.5 mils dry, per coat.
- D. Cement Board Substrates:
 - 1. The Sherwin-Williams Company.
 - a. Prime Coat: Loxon Concrete & Masonry Primer Sealer, LX02W50.
 - 1) at 8.0 mils wet, 3.2 mils dry.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: A-100 Exterior Latex Satin, A82 Series, satin.
 - 1) at 4.0 mils wet, 1.5 mils dry, per coat.
- E. Steel Substrates – Unprimed:
 - 1. The Sherwin-Williams Company.
 - a. 1 coat ProCryl Universal Water-Based Primer.
 - b. 2 coats Pro-Industrial Acrylic.
- F. Steel Substrates - Unprimed:
 - 1. The Sherwin-Williams Company.
 - a. 1 coat Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
 - b. 2 coats Pro Industrial WB Alkyd Urethane.
- G. Steel Substrates - Primed:
 - 1. The Sherwin-Williams Company.
 - a. 1 touchup coat Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
 - b. 2 coats Pro Industrial WB Alkyd Urethane.
- H. Galvanized Steel Substrates – (except railings, handrails and guardrails):
 - 1. The Sherwin-Williams Company.
 - a. 1 touchup coat Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
 - b. 2 coats Pro Industrial WB Alkyd Urethane.

- I. Primed Steel Doors and Frames:
 - 1. The Sherwin-Williams Company.
 - (At Concession for underside of roof, columns, and HM doors an frames).
 - a. Prime Coat: Primer, rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - 1) at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Water-based Acrylic, matching topcoat.
 - c. Topcoat: Water-based Acrylic: Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, semigloss.
 - 1) at 2.5 to 4.0 mils dry, per coat.
- J. Metal Panel Substrates (existing metal wall panels):
 - 1. The Sherwin-Williams Company.
 - a. Prepare surfaces in strict accordance with paint manufacturer's recommendations. Minimum surface preparation shall be according to SSPC-SP WJ-4/NACE WJ-4 "Light Cleaning" requirements, unless otherwise recommended by paint manufacturer to suit conditions of substrates involved.
 - b. No primer needed.
 - c. 2 coats Bond-Plex Waterbased Acrylic Coating, low sheen.
- K. Aluminum Substrates:
 - 1. The Sherwin-Williams Company.
 - a. 2 coats A-100 Latex, satin.
- L. Plastic Trim Fabrications:
 - 1. The Sherwin-Williams Company.
 - a. 1 coat Extreme Bond Primer.
 - b. 2 coats Pro-Industrial Acrylic Coating, semigloss.

END OF SECTION 099113

SECTION 099123 - 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 masonry units (CMUs).
 - 2. Steel and iron.
 - 3. Galvanized metal.
 - 4. Aluminum (not anodized or otherwise coated).
 - 5. Gypsum board.
 - 6. Miscellaneous mechanical, electrical, plumbing, fire suppression, communication and technology work as delineated in this Section.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
 - 2. Section 012200 "Unit Prices" for unit prices affecting work of this Section.
 - 3. Section 012300 "Alternates" for those alternates related to work of this Section.
 - 4. Section 051200 "Structural Steel Framing" for shop priming structural steel.
 - 5. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
 - 6. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
 - 7. Section 099600 "High-Performance Coatings" for special-use coatings.

1.2 DEFINITIONS

- A. Gloss Level 1 "Matte": Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2 "Flat": Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3 "Eggshell": 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4 "Satin-like": 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5 "Semi-gloss": 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6 "Gloss": 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7 "High Gloss": 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. Indicate VOC content.
- B. Samples for Initial Selection: Where colors are not specifically indicated, submit for each type of topcoat product.
- C. 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 square.
 - 2. Label each coat of each Sample.
- D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas.
2. Use same designations indicated on Drawings and in schedules.
3. Include color designations.
4. VOC content.

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

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints 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 - Basis of Design Products: Subject to compliance with requirements, provide products The Sherwin-Williams Company, or comparable products listed below:
 1. Benjamin Moore & Co.
 2. Glidden Professional.
 3. PPG Paints.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits for paints and paint colorants:
 - 1. Paints and Coatings: Less than 50 g/L.
- C. Low-Emitting Materials: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Colors: Where not indicated on Drawings, as selected by Architect from manufacturer's full range.
 - 1. Twenty percent of surface area will be painted with deep tones.
- E. Material Finish Schedule designations: As indicated on Material Finish Legend.
 - 1. Provide "flat" sheen for ceilings, unless otherwise specified.
- F. Provide "eggshell" sheen for walls, unless otherwise specified.
- G. Paint Systems: Refer to schedule at end of this Section.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner may 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. Plaster Substrates: Verify that plaster is fully cured.
- E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- F. 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 applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, marker boards 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. Masonry Substrates: Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, mortar, efflorescence and sealers. Wash surfaces with an abrasive cleanser and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer.
 - 1. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:
 - 1. SSPC-SP 3.
- F. 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.
- G. 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.
- H. Aluminum Substrates: Remove loose surface oxidation.
- I. Existing Substrates: Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Prepare substrates in accordance with paint manufacturer's recommendations to ensure adhesion.

3.3 APPLICATION

- A. Apply paints according to paint manufacturer's written instructions and to recommendations.
 - 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.
 - 6. Paint exposed air diffusers and grilles same color as adjacent wall or ceiling finish as directed by Architect.

7. Mask off surfaces of doors prior to painting vision lite frames. Clean any excess paint from door surface to so that there is no evidence of excess paint remaining on door face and glass.
- 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 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.
 2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
- F. Marking and Identification: Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other walls required to have protected openings and penetrations shall be permanently identified with stenciling. Such identification shall:
 1. Be located in accessible concealed floor, floor/ceiling or attic spaces;
 2. Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition; and
 3. Shall include lettering not less than 3 inches in height with a minimum 3/8-inch wide stroke in a contrasting color incorporating the following wording on the first line: "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS".

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. Existing CMU Substrates – Latex System:
 - 1. Benjamin Moore & Co.
 - a. 1 touchup coat Ultra Spec 500 Interior Latex Primer N534.
 - b. 2 coats Ultra Spec 500 Interior Eggshell N538.
 - 2. Glidden Professional.
 - a. 1 touchup coat Speedhide Int/Ext Block Filler (spot prime bare areas)
 - b. 2 coats Ultra-Hide Zero VOC Interior Latex, eggshell.
 - 3. PPG Paints.
 - a. 1 touchup coat Speedhide Int/Ext Block Filler (spot prime bare areas)
 - b. 2 coats Speedhide Zero VOC Interior Latex, eggshell.
 - 4. The Sherwin-Williams Company.
 - 1) 1 touchup coat ProMar 200 Zero VOC Interior Latex Primer (spot prime bare areas).
 - 2) 2 coats ProMar 200 Zero VOC Latex; semi-gloss.
- B. CMU Substrates, Wall Surfaces - Latex System.
 - 1. The Sherwin-Williams Company.
 - a. Block Filler: Pro Industrial Heavy Duty Block Filler, B42W150.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: ProMar 200 Zero VOC Latex, B31-2600 Series, semigloss.
- C. CMU Substrates – Epoxy System: Refer to Section 099600.
- D. Steel Substrates – Non-primed:
 - 1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec Acrylic Metal Primer HP04.
 - b. 2 coats Ultra Spec DTM acrylic Low Luster Enamel HP25.
 - 2. Glidden Professional.
 - a. 1 coat Metal primer as recommended by topcoat manufacturer.
 - b. 2 coats Diamond Acrylic Enamel.
 - 3. PPG Paints.
 - a. 1 coat Metal primer as recommended by topcoat manufacturer.
 - b. 2 coats Diamond Acrylic Enamel.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat of Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
 - b. 2 coats Pro Industrial WB Alkyd Urethane, semigloss.
- E. Steel Substrates – Pre-primed:
 - 1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec Acrylic Metal Primer HP04.
 - b. 2 coats Ultra Spec DTM acrylic Low Luster Enamel HP25.
 - 2. Glidden Professional.
 - a. 1 coat Metal primer as recommended by topcoat manufacturer.
 - b. 2 coats Diamond Interior Acrylic Enamel.
 - 3. PPG Paints.
 - a. 1 coat Pitt-Tech Plus Acrylic DTM Primer.
 - b. 2 coats Speedhide WB Alkyd Enamel.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat of Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
 - b. 2 coats Pro-Industrial Acrylic.
- F. Steel Hollow Metal Doors and Frames (including doors, frames, metal glass stops, vision lite frames, astragals and metal louvers):
 - 1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec Acrylic Metal Primer HP04
 - b. 2 coats Ultra Spec DTM acrylic Low Luster Enamel HP25
 - 2. Glidden Professional.

- a. 1 coat Metal primer as recommended by topcoat manufacturer.
 - b. 2 coats Diamond Interior Acrylic Enamel.
 - 3. PPG Paints.
 - a. 1 coat Pitt-Tech Plus Acrylic DTM Primer.
 - b. 2 coats Speedhide WB Alkyd Enamel.
 - c. 2 coats of Pitt-Tech Plus Acrylic DTM Enamel
 - 4. The Sherwin-Williams Company.
 - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Pro Industrial Acrylic Coating, B66-650 Series, semigloss.
 - 5. The Sherwin-Williams Company.
 - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - b. Intermediate Coat: Light industrial coating, semigloss.
 - c. Topcoat: Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-1151 Series.
- G. Steel Substrates (exposed metal decking, bar joists and exposed overhead structure) – Dryfall.
- 1. Benjamin Moore & Co.
 - a. 2 coats Latex Dryfall 396, eggshell.
 - 2. Glidden Professional.
 - a. 2 coats Supertech Acrylic Dryfall, eggshell.
 - 3. PPG Paints.
 - a. 2 coats Speedhide Supertech Acrylic Dryfall.
 - 4. The Sherwin-Williams Company.
 - a. Top Coat: Pro Industrial Waterborne Acrylic Dryfall Flat, B42-181 Series, flat.
 - b. Top Coat: Pro Industrial Waterborne Acrylic DryFall Eg-Shel, B42-82, eggshell.
- H. Galvanized-Metal Substrates (where not specifically indicated to be painted):
- 1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec Acrylic Metal Primer HP04.
 - b. 2 coats Ultra Spec DTM acrylic Low Luster Enamel HP25.
 - 2. Glidden Professional.
 - a. 1 coat Metal primer as recommended by topcoat manufacturer.
 - b. 2 coats Diamond Interior Acrylic Enamel, eggshell.
 - 3. PPG Paints.
 - a. 1 coat Pitt-Tech Plus Acrylic DTM Primer.
 - b. 2 coats Pitt-Tech Plus Acrylic Enamel, eggshell.
 - 4. The Sherwin-Williams Company.
 - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - 1) at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Pro Industrial Acrylic Coating, B66-650 Series, semigloss.
 - 1) at 2.5 to 4.0 mils dry, per coat.
 - 5. The Sherwin-Williams Company.
 - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - b. Intermediate Coat: Light industrial coating, semigloss.
 - c. Topcoat: Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-1151 Series.
- I. Galvanized-Metal Ductwork Substrates:
- 1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec HP Acrylic Metal Primer HP04, 4.0-5.5 mils wet, 1.7-2.3 mils dry.
 - b. 2 coats Latex Dryfall Eggshell 396.
 - 2. Glidden Professional.
 - a. 1 coat Metal primer as recommended by topcoat manufacturer.
 - b. 2 coats Supertech Acrylic Dryfall, eggshell.
 - 3. PPG Paints.
 - a. 1 coat Pitt-Tech Plus Acrylic DTM Primer.
 - b. 2 coats Speedhide Supertech Acrylic Dryfall, eggshell.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat of Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
 - b. 2 coats Pro Industrial Waterborne Acrylic Dryfall.

- J. Aluminum (Not Anodized or Otherwise Coated) Substrates:
1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec Acrylic Metal Primer HP04
 - b. 2 coats Ultra Spec DTM acrylic Low Luster Enamel HP25
 2. Glidden Professional.
 - a. 1 coat Metal primer as recommended by topcoat manufacturer.
 - b. 2 coats Diamond Interior Acrylic Enamel.
 3. PPG Paints.
 - a. 1 coat Pitt-Tech Plus Acrylic DTM Primer.
 - b. 2 coats Speedhide WB Alkyd Enamel.
 4. The Sherwin-Williams Company.
 - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Pro Industrial Acrylic Coating, B66-650 Series, semigloss.
 5. The Sherwin-Williams Company.
 - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - b. Intermediate Coat: Light industrial coating, semigloss.
 - c. Topcoat: S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-1151 Series.
- K. Gypsum Board Wall Substrates – Latex System:
1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec 500 Interior Latex Primer N534.
 - b. 2 coats Ultra Spec 500 Interior Eggshell N538.
 2. Benjamin Moore & Co.
 - a. 1 coat ECO SPEC Interior Latex Primer N372.
 - b. 2 coats ECO SPEC Interior Latex 100% Acrylic Semi-Gloss finish N376 Series.
 3. Glidden Professional.
 - a. 1 coat Ultra-Hide Zero VOC Interior Latex Wall Primer.
 - b. 2 coats Ultra-Hide Zero VOC Interior Latex, eggshell.
 4. PPG Paints.
 - a. 1 coat Speedhide Zero VOC Interior Latex Primer.
 - b. 1 coat of Speedhide Interior Latex Wall Primer/Sealer
 - c. 2 coats Speedhide Zero VOC Interior Latex, eggshell.
 5. The Sherwin-Williams Company.
 - a. Prime Coat: ProMar 200 Zero VOC Latex Primer, B28W2600.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: ProMar 200 Zero VOC Latex, B20-2600 Series, eggshell.
 6. The Sherwin-Williams Company.
 - a. Prime Coat: ProMar 200 Zero VOC Latex Primer, B28W2600.
 - b. Intermediate Matching topcoat.
 - c. Topcoat: Pro Industrial Pre-Catalyzed Water Based Epoxy, K45-1151 Series, eggshell.
- L. Gypsum Board Ceiling Substrates – Latex:
1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec 500 Interior Latex Primer N534.
 - b. 2 coats Ultra Spec 500 Interior Eggshell N538.
 2. Glidden Professional.
 - a. 1 coat Ultra-Hide Zero VOC Interior Latex Wall Primer.
 - b. 2 coats Ultra-Hide Zero VOC Interior Latex, flat.
 3. PPG Paints.
 - a. 1 coat Speedhide Zero VOC Interior Latex Primer.
 - b. 2 coats Speedhide Zero VOC Interior Latex, flat.
 4. The Sherwin-Williams Company.
 - a. 1 coat ProMar 200 Zero VOC Interior Latex Primer.
 - b. 2 coats ProMar 200 Zero VOC Latex, flat.
- M. Gypsum Board Wall Substrates – Epoxy: Refer to Section 099600.

- N. Gypsum Board Wall and Ceiling Substrates indicated to receive Vinyl Wall Graphics – prepare per the wallcovering manufacturer's printed recommendations.
 - 1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec 500 Interior Latex Primer N534.
 - 2. Glidden Professional.
 - a. 1 coat Ultra-Hide Premium Latex Wall Primer.
 - 3. PPG Paints.
 - a. 1 coat Speedhide Interior Latex Wall Primer/Sealer.
 - 4. The Sherwin-Williams Company
 - a. 1 coat ProMar 200 Zero VOC Interior Latex Primer.
 - b. 1 coat ProMar 200 Zero VOC, eggshell.
- O. Gypsum Board Wall and Ceiling Substrates indicated to receive Wall Covering – prepare per the wallcovering manufacturer's printed recommendations.
 - 1. Benjamin Moore & Co.
 - a. 1 coat Ultra Spec 500 Interior Latex Primer N534.
 - 2. Glidden Professional.
 - a. 1 coat Ultra-Hide Premium Latex Wall Primer.
 - 3. PPG Paints.
 - a. 1 coat Speedhide Interior Latex Wall Primer/Sealer.
 - 4. The Sherwin-Williams Company.
 - a. Roman Adhessives.
 - 1) 1 coat Pro-977 Ultra Prime.

END OF SECTION 099123

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SECTION 099600 - HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:
 - 1. Exterior Substrates:
 - a. Concrete, vertical and horizontal surfaces.
 - b. Concrete masonry units (CMUs).
 - c. Steel.
 - d. Galvanized metal.
 - e. Aluminum (not anodized or otherwise coated).
 - 2. Interior Substrates:
 - a. Concrete, vertical and horizontal surfaces.
 - b. Cement board.
 - c. Concrete masonry units (CMUs).
 - d. Steel.
 - e. Galvanized metal.
 - f. Aluminum (not anodized or otherwise coated).
 - g. Wood.
 - h. Fiberglass.
 - i. Gypsum board.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
 - 2. Section 012200 "Unit Prices" for unit prices affecting work of this Section.
 - 3. Section 012300 "Alternates" for those alternates related to work of this Section.
 - 4. Section 051200 "Structural Steel Framing" for shop priming of structural steel with primers specified in this Section.
 - 5. Section 099113 "Exterior Painting" for general field painting.
 - 6. Section 099123 "Interior Painting" for general field painting.

1.2 DEFINITIONS

- A. Gloss Level 3 "Eggshell": 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 5 "Semi-gloss": 35 to 70 units at 60 degrees, according to ASTM D 523.
- C. Gloss Level 6 "Gloss": 70 to 85 units at 60 degrees, according to ASTM D 523.
- D. Gloss Level 7 "High Gloss": 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. 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: For each product indicated, include the following:
1. Cross-reference to coating system and locations of application areas.
 2. Use same designations indicated on Drawings and in schedules.
 3. 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: One (1) gallon of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated 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 coating system.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
 - b. Pipe and Tube Railings: Paint at one section of railing.
 - c. 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 Substantial 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.
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 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.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers - Basis of Design Products: Subject to compliance with requirements, provide products by The Sherwin-Williams Company, or comparable products listed below:
1. Benjamin Moore & Co.
 2. Glidden Professional.

3. PPG Paints.
4. Tnemec Company, Inc.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. Material Compatibility:
 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
 3. Products shall be of same manufacturer for each coat in a coating system.
- B. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits for paints and paint colorants:
 1. Paints and Coatings: Less than 50 g/L.
 2. Colorants shall be 0 VOC.
- C. Low-Emitting Materials: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Colors: Where not indicated on Drawings, as selected by Architect from manufacturer's full range.
- E. Paint Systems: Refer to schedule at end of this Section.
- F. Material Finish Legend designations:
 1. Wall & Ceiling Finishes: 099600.A01, finishes **"HP1" through "HP2."**

2.3 SOURCE QUALITY CONTROL

- A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:
 1. Owner may 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. Fiber-Cement Board: 12 percent.
 3. Masonry (Clay and CMUs): 12 percent.
 4. Wood: 15 percent.
 5. 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 applicable to substrates and paint systems indicated.
 - 1. Prepare previously painted surfaces indicated to receive new paint finish in strict accordance with paint manufacturer's written recommendations.
- 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 all surface contamination such as 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 concrete by one of the following methods as recommended by paint manufacturer:
 - a. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.
 - b. Abrasive blast clean surfaces to comply with SSPC-SP 7/NACE No. 4.
 - 2. Verify that chemical removal agents (if used) have been neutralized prior to installation of paint products.
- E. Masonry Substrates: Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, mortar, efflorescence and sealers. Wash surfaces with an abrasive cleanser and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer.
 - 1. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.
 - 2. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- 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 coatings.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer that is recommended in writing by topcoat manufacturer for coating 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 filler that is recommended in writing by topcoat manufacturer for coating system indicated. Sand smooth when dried.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions.
 - 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.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test 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.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing 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 Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Concrete Substrates (Not subject to Pedestrian or Vehicular traffic):
 - 1. Benjamin Moore & Co.
 - a. 1 coat Corotech V400 Polyamide Epoxy
 - b. 1 coat Corotech V510 Aliphatic Acrylic Urethane
 - 2. Glidden Professional.
 - a. 1 coat Rustoleum Polyamide Epoxy.
 - b. 1 coat Rustoleum Polyester/Acrylic Urethane, semi-gloss.
 - 3. PPG Paints.
 - a. 1 coat Amerlock Series.
 - b. 1 coat Amercoat450H Acrylic Urethane.
 - 4. The Sherwin-Williams Company.

- a. 1 coat Macropoxy 646-100.
 - b. 1 coat Waterbased Acrolon 100 HS Acrylic Polyurethane.
 - 5. Tnemec Company, Inc.
 - a. 1 coat Tnemec Series N69 High Build Epoxoline II.
 - b. 1 coat Tnemec Series 1074 Endura-Shield.
- B. Galvanized Metal Bollards and Trash Enclosure Framing:
 - 1. Benjamin Moore & Co.
 - a. 1 coat Corotech V400 Polyamide Epoxy.
 - b. 1 coat Corotech V510 Aliphatic Acrylic Urethane.
 - 2. Glidden Professional.
 - a. 1 coat Rustoleum Polyamide Epoxy.
 - b. 1 coat Rustoleum Aliphatic Acrylic Urethane.
 - 3. PPG Paints.
 - a. 1 coat Amerlock Series.
 - b. 1 coat Amercoat450H Acrylic Urethane.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat Macropoxy 646-100.
 - b. 1 coat Pro Industrial WB Alkyd Urethane.
 - c. Pro Industrial DTM Acrylic.
 - 5. Tnemec Company, Inc.
 - a. 1 coat Tnemec Series N69 High Build Epoxoline II.
 - b. 1 coat Tnemec Series 1074 Endura-Shield.
- C. Structural and Miscellaneous Steel (including service piping):
 - 1. Benjamin Moore & Co.
 - a. 1 coat Corotech V150 Polyamide Epoxy Primer
 - b. 2 coats Corotech V510 Aliphatic Acrylic Urethane Semi-Gloss
 - 2. Glidden Professional.
 - a. 1 coat Rustoleum HB Polyamide Epoxy Primer.
 - b. 2 coats Rustoleum Aliphatic Acrylic Urethane, semi-gloss.
 - 3. PPG Paints.
 - a. 1 coat Amercoat 385, 5 to 8 mils DFT.
 - b. 2 coats Amercoat 450H.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat Macropoxy 646-100.
 - b. 1 coat Waterbased Acrolon 100 HS Acrylic Polyurethane.
 - 5. Tnemec Company, Inc.
 - a. 1 primer coat of Tnemec Series 161 Tneme-Fascure, polyamide epoxy, 7 mils wet, 4 mils dry.
 - b. 1 epoxy intermediate coat or scarification is required if prime coat is exposed to exterior weather for more than three (3) weeks.
 - c. 1 topcoat of Tnemec Series 750, Endura-Shield, aliphatic polyester polyurethane, 3 mils wet, 1.5 mils dry, spray applied.
 - d. Note: Number of coats may need to be increased to provide specified DFT and to achieve uniform coverage and hiding.
- D. Steel Substrates:
 - 1. Benjamin Moore & Co.
 - a. 1 coat N/A
 - b. 1 coat N/A
 - 2. PPG Paints.
 - a. 1 coat Amercoat 385.
 - b. 1 coat Corafon ADS.
 - 3. The Sherwin-Williams Company.
 - a. 1 coat Macropoxy 646-100.
 - b. 1 coat FluoroKem HS.
 - 4. Tnemec Company, Inc.
 - a. 1 coat of Tnemec Series 135 Chembuild.
 - b. 1 coat Tnemec Series 1070V Fluoronar.

E. Exposed Galvanized Structural Steel, Steel Joists and Miscellaneous Canopy Framing:

1. Benjamin Moore & Co.
 - a. 1 touchup coat Corotech V170 Organic Zinc Rich Primer
 - b. 2 coats Corotech V510 Aliphatic Acrylic Urethane Semi-Gloss
2. Glidden Professional.
 - a. 1 touchup coat Rustoleum Zinc-Rich Epoxy Primer.
 - b. 2 coats Rustoleum Aliphatic Acrylic Urethane, semi-gloss.
3. PPG Paints.
 - a. 1 touchup coat Amercoat 68HS Organic Zinc-Rich Epoxy.
 - b. 2 coats PSXONE High-Performance Polyacrylic Siloxane.
Sheen as selected by Architect : Satin or Gloss.
4. The Sherwin-Williams Company.
 - a. 1 coat Pro Industrial Pro-Cryl Universal Primer.
 - b. 2 coats Pro Industrial Pre-Catalyzed Epoxy.

F. Underside of Metal Roofing and back sides of Metal Fascia at Canopy:

1. Benjamin Moore & Co.
 - a. 1 coat Corotech V110 Acrylic Metal Primer
 - b. 2 coats Benjamin Moore HP29 DTM Acrylic Semi-Gloss.
2. Glidden Professional.
 - a. 1 coat Rustoleum High-Solids Rust-Inhibitive Metal Primer.
 - b. 2 coats Rustoleum Aliphatic Acrylic Urethane, semi-gloss.
3. PPG Paints.
 - a. 1 coat Amercoat 185H Rust-Inhibitive Metal Primer.
 - b. 2 coats PSXONE High-Performance Polyacrylic Siloxane.
Sheen as selected by Architect : Satin or Gloss.
4. The Sherwin-Williams Company.
 - a. 1 coat Pro Industrial Pro-Cryl, universal water base primer.
 - b. 2 coats Pro Industrial Acrylic.

3.7 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Exposed Structural Steel Columns and Framing:

1. Benjamin Moore & Co.
 - a. 1 coat Corotech V150 Polyamide Epoxy Primer.
 - b. 1 coat Corotech V510 Aliphatic Acrylic Urethane.
2. Glidden Professional.
 - a. 1 coat Rustoleum HB Polyamide Epoxy Primer.
 - b. 1 coat Rustoleum Aliphatic Acrylic Urethane, semi-gloss.
3. PPG Paints.
 - a. 1 coat Amercoat 385, 5 to 8 mils DFT.
 - b. 1 coat Amercoat 450H.
4. The Sherwin-Williams Company.
 - a. 1 coat Macropoxy 646-100.
 - b. 1 coat Waterbased Acrolon 100 HS Acrylic Polyurethane.

B. Concrete and CMU Substrates - Epoxy System (non-wet walls):

1. Benjamin Moore & Co.
 - a. 1 coat Corotech V163 Waterborne Epoxy Block Filler.
 - b. 2 coats Corotech V341 Pre-Catalyzed Waterborne Wall Epoxy Semi-Gloss.
2. Glidden Professional.
 - a. 1 coat DecraFlex Block Surfer
 - b. 2 coats WB1 Pre-Catalyzed WB Epoxy Enamel, I single-component, eggshell.
3. PPG Paints.
 - a. 1 coat Perma-Crete Block Surfer, 18 mils wet, 10 mils dry.
 - b. 2 coats Pitt-Glaze Industrial WB Pre-Catalyzed Epoxy, single-component, eggshell.
4. The Sherwin-Williams Company.
 - a. 1 coat Loxon Concrete and Masonry Primer LX02 Series

- b. 1 coat Pro Industrial Heavy-Duty Block Filler.
 - c. 2 coats Pro Industrial Pre-Catalyzed Waterbased Epoxy, 1150 Series, single-component, Sheen as selected by Architect: Eggshell or Semi-gloss.
- C. Concrete and CMU Substrates - Epoxy System (wet areas):
 - 1. Benjamin Moore & Co.
 - a. 1 coat Corotech V163 Waterborne Epoxy Block Filler.
 - b. 2 coats Corotech V400 Polyamide Epoxy Coating.
 - 2. Glidden Professional.
 - a. 1 coat Rustoleum Epoxy Block Filler.
 - b. 2 coats Rustoleum Polyamide Epoxy enamel, two-component.
 - 3. PPG Paints.
 - a. 1 coat Amerlock 400BF two-component Epoxy Block Filler.
 - b. 1 coat Amerlock 2/400 HB two-component Epoxy Enamel.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat Loxon Water Blocking Primer/Finish LX12 Series.
 - b. 1 coat Pro Industrial Heavy-Duty Block Filler.
 - c. 2 coats Pro Industrial Zero VOC Waterborne Catalyzed Epoxy, two-component, Sheen as selected by Architect : Eggshell or Gloss
- D. Gypsum Board Wall Substrates – Epoxy:
 - 1. Benjamin Moore & Co.
 - a. 1 coat Benjamin Moore N534 Ultra Spec 0 VOC Latex Primer.
 - b. 2 coats Corotech V342 Pre Catalyzed Waterborne Epoxy Eggshell.
 - 2. Glidden Professional.
 - a. 1 coat Lifemaster Zero VOC Interior Wall Primer
 - b. 2 coats WB1 Pre-Catalyzed WB Epoxy, single-component, eggshell.
 - 3. PPG Paints.
 - a. 1 coat Speedhide Low VOC.
 - b. 2 coats Pitt-Glaze Industrial Pre-Catalyzed Water Based Epoxy, single-component, eggshell.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat ProMar 200 Zero VOC Interior Primer.
 - b. 2 coats Pro Industrial Pre-Catalyzed Waterbased Epoxy, 1150 Series, single-component, [eggshell][semi-gloss].
- E. Gypsum Board Wall Substrates – Epoxy (wet areas):
 - 1. Benjamin Moore & Co.
 - a. 1 coat Benjamin Moore N534 Ultra Spec 0 VOC Latex Primer.
 - b. 2 coats Corotech V450 Waterborne Acrylic Epoxy Semi-Gloss.
 - 2. Glidden Professional.
 - a. 1 coat Lifemaster Zero VOC Interior Wall Primer
 - b. 2 coats Rustoleum Polyamide Epoxy Enamel, two-component.
 - 3. PPG Paints.
 - a. Speedhide Low VOC is also a LEEDv4 primer for better sealer properties than Zero VOC primers.
 - b. 2 coats Aquapon Catalyzed WB Polyamide Epoxy, two-component.
 - 4. The Sherwin-Williams Company.
 - a. 1 coat ProMar 200 Zero VOC Interior Primer.
 - b. 2 coats Pro Industrial Zero VOC Waterborne Catalyzed Epoxy, two-component, Sheen as selected by Architect : Eggshell or Gloss
- F. Gypsum Board Ceiling Substrates – Epoxy (wet areas):
 - 1. Benjamin Moore & Co.
 - a. 1 coat Benjamin Moore N534 Ultra Spec 0 VOC Primer.
 - b. 2 coats Corotech V450 Waterborne Acrylic Epoxy Semi-Gloss.
 - 2. Glidden Professional.
 - a. 1 coat Lifemaster Zero VOC Interior Wall Primer.
 - b. 2 coats Rustoleum Polyamide Epoxy Enamel, two-component.
 - 3. PPG Paints.
 - a. Speedhide Low VOC is also a LEEDv4 primer for better sealer properties than Zero VOC primers.
 - b. 2 coats Aquapon Catalyzed WB Polyamide Epoxy, two-component.

4. The Sherwin-Williams Company.
 - a. 1 coat Sherwin Williams Macropoxy 646-100.
 - b. 2 coats Pro Industrial Zero VOC Waterborne Catalyzed Epoxy, two-component, Sheen as selected by Architect : Eggshell or Gloss .

END OF SECTION 099600

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SECTION 101100 - VISUAL DISPLAY UNITS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Tackboards (101100.A03 - *TB1*).
 - 2. Visual Display Rails (101100.A04 - *VDR*).

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, finishes, and accessories for visual display units.
- B. Shop Drawings: For visual display units.
 - 1. Include plans, elevations, sections, details, and attachment to other work.
 - 2. Show locations of panel joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
 - 3. Show locations and layout of special-purpose graphics.
 - 4. Include sections of typical trim members.
 - 5. Show dimensioned layout and elevation of each area, indicate number of panels for each layout.
 - 6. Include illustrations of each type of mounting system.
- C. Samples for Verification: For each type of visual display unit indicated.
 - 1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.
 - 2. Trim: 6-inch-long sections of each trim profile.
 - 3. Accessories: Full-size Sample of each type of accessory.
- D. Product Schedule: For visual display units. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of tackboards.
- C. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For visual display units[and motorized units] 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.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install visual display units 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 occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of construction contiguous with visual display units by field measurements before fabrication.
 - 1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of visual display unit from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. NFPA 258: Class B
 - 2. NFPA 255 - Class II

2.3 TACKBOARD (101100.A03 - TB1)

- A. Tackboard Panel Assembly: Consisting of tackboard panels with cork facing on core with aluminum trim.
- B. Basis of Design: Subject to compliance with requirements, provide "Concept Tackboards" by Claridge Products or one of the following manufacturers meeting the specified product characteristics:
 - 1. Marsh by PolyVision.
 - 2. Tack Surface: Basis of Design: "Claridge Cork" by Claridge Products.
- C. Color: No. 1109 Buff, or as selected by Architect from manufacturer's full range.
- D. Maintenance: Manufacturer's cleaning recommendations.
- E. Width: As indicated on Drawings.
- F. Height: As indicated on Drawings.
- G. Trim: 5/16" eased aluminum trim.

2.4 VISUAL DISPLAY RAILS (101100.A04 -VDR)

- A. Visual Display Rail: Consisting of aluminum frame with insert from below.
- B. Basis of Design: Subject to compliance with requirements, provide "Casso Display Rail " by AS Hanging Display Systems or one of the following manufacturers meeting the specified product characteristics:
 - 1. Marsh by PolyVision.
 - 2. Height: 2 inch.
 - 3. Length: 72 inches
 - 4. Finish:
 - a. Anodized silver.
 - 5. Accessories:
 - a. Flat End Stops

2.5 MATERIALS

- A. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
- B. Extruded Aluminum: ASTM B 221, Alloy 6063.
- C. Fiberboard: ASTM C 208 cellulosic fiber insulating board.
- D. Hardboard: ANSI A135.4, tempered.
- E. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish with surface-burning characteristics indicated.
- F. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
- G. Particleboard: ANSI A208.1, Grade M-1.
- H. Polyester Fabric: Nondirectional weave, 100 percent polyester; weighing not less than 15 oz./sq. yd.; with surface-burning characteristics indicated.
- I. Vinyl Fabric: Mildew resistant, washable, complying with FS CCC-W-408D, Type II, [burlap weave] ; weighing not less than 13 oz./sq. yd.; with surface-burning characteristics indicated.

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. Protect mechanical 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.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.
- C. Examine walls and partitions for proper preparation and backing for visual display units.
- D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.
- E. 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, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.
- C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.
- D. Prepare recesses for sliding visual display units as required by type and size of unit.

3.3 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES

- A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches o.c. Secure both top and bottom of boards to walls. Do NOT adhesively apply visual display boards to wall substrates.

3.4 CLEANING AND PROTECTION

- A. Clean visual display units according to manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display units after installation and cleaning.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motorized, sliding visual display units.

END OF SECTION 101100

SECTION 101400 - SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Signage:
 - a. Fabricated:
 - 1) Non-illuminated (101400.A10).
 - 2) Illuminated – Halo Lit (101400.A12).
 - b. Flat Cut:
 - 1) Custom (101400.A31).
- B. Related Sections include the following:
 - 1. Section 012100 "Allowances" for interior signage and exterior door signage.
 - 2. Section 061000 "Rough Carpentry" for signage blocking.
 - 3. Division 26 Section "Interior Lighting" and "Exterior Lighting" for illuminated signs.

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."
- B. Final Artwork: High resolution digital files to be used for production (including digital printing).
 - 1. Graphics shown in drawings are placeholders only.
 - 2. Final artwork to be supplied by Designer (or architect), after approval from Owner, to Signage contractor.
 - 3. Signage Contractor to use final art in creating shop drawings for approval by Designer,
- C. Signage Contractor: Contractor responsible for the fabrication and installation of signage unless responsibility for fabrication or installation is called out by others in the drawings.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule including submittals, engineering, fabrication and installation. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for during and after installation.
 - 3. Architect to work with Contractor to arrange the meeting. Architect to set agenda and run the meeting.
- B. Signage Contractor is responsible for obtaining all required signage permits.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Including but not limited to, the following:
 - 1. Manufacturer's technical product data for each type of product specified. Include data on physical characteristics, durability, fade resistance, flame resistance and manufacturing process.
 - 2. Product data shall show compliance with requirements for fire performance characteristics and physical properties.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of signs and supports. Include plans, elevations, and large scale details of sign wording and lettering layout. Include large scale sections of typical members and other components.

1. Show fabrication joints and fasteners. Show anchors, grounds, reinforcement, accessories, layout, and installation details including attachments to other work. Indicate materials and profiles of signage fittings, joinery, finishes, fasteners, anchorages, and accessory items.
 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 3. Based on Message Schedule approved by Owner, provide sign layouts for all signs:
 - a. Indicate message line breaks.
 - b. Include large scale details of signs wording and lettering layout, pictograms (arrows and symbols), artwork, and Braille layout.
 - c. Include outline of sign face, character spacing, line spacing, and copy composition.
 - d. Submit product data simultaneously for overall review and comparison prior to fabrication.
 4. Field Dimensions shall be obtained, reviewed, and accepted by signage manufacturer prior to submittal of shop drawings. Refer to Article 1.4.G. "Field Dimensions for Environmental Graphics."
 5. For signage required to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 6. Wiring Diagrams: For illuminated signs and illuminated characters. Include locations of transformers and disconnect switches.
 7. For signs supported by or anchored to permanent construction, provide setting drawings, full-size spacing templates, and directions for installation of anchor bolts and other appropriate anchors to be installed.
 8. Submit drawings in 11 inch by 17 inch format unless otherwise requested by the Architect.
 9. Submit all shop drawings as a single package by Signage Contractor.
- C. Sign Schedule: Use same designations indicated on Drawings.
- D. 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. Sign Types:
 - a. Paint samples for all colors.
- E. Samples for Verification:
1. Submit an 8 inch by 10 inch sample of each material showing finishes, colors, surface textures and qualities of manufacturer and design of each component including graphics.
 2. Submit full-size samples of signage. Quantity and type shall be determined by Architect with intent of one sample per each signage type representative of all types of products indicated.
 3. Submit 12-inch-long actual samples of each accessory required.
 4. Samples to be kept by the Architect as a record to later match against items in the field.
- F. Delegated-Design Submittal: For all signage unless otherwise noted.
1. Signage Contractor is responsible for determining proper mounting, fastening and anchoring methods including the design of concrete bases, concrete footings, and anchorage to signage frame for all signs unless noted otherwise. Determination to account for surface material sign is being mounted upon.
 2. Drawings are for aesthetic and functional design intent, only. No instructions for structural appropriateness have been made. It is the responsibility of the signage contractor to ensure that all elements are fabricated for a stable and durable installation while adhering to the aesthetic details indicated.
 3. Professional Engineer Qualifications: A legally qualified professional engineer licensed in the State of Missouri who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for design and installations of signs, flagpoles, and miscellaneous support that is similar to those indicated for this Project in material, design, and extent. Include structural analysis calculations for signs indicated to comply with design loads; signed and sealed by the qualified professional engineer responsible for their preparation.
- G. Field Dimensions for Graphic Design:
1. Provide field dimensions to Architect for graphic design of graphics.
 - a. Field dimensions shall be accepted by Architect prior to final art release.
 2. Include dimensions, locations, and graphic depictions of all disruptions within the field of wall surface indicated to receive graphic signage. Examples of disruptions of wall surface include, but are not limited to, the following:
 - a. Louvers, Vents, Ductwork, Thermostats.
 - b. Outlets, Light Switches, Light Fixtures, and Conduit.
 - c. Wall Base, Baseboards, Corner Guards, Expansion Joints, and Reveal Joints.
 - d. Motion Sensors.
 - e. Fire Alarm Devices.

- f. Fire Extinguishers and Fire Extinguisher Cabinets.
 - g. Furnitures.
 - h. ADA signage, Room Signage, and other Code required signage.
 - i. Doors and Windows.
 - j. Mullions, Frames, and Handles.
 - k. Televisions.
 - l. Other obstructions to wall or glazing surfaces not listed that would adversely affect wall graphic design.
- 3. Elevations and dimensions shall be drawing using a computer aided drafting program and submitted in a legible format.
 - 4. Dimensional Tolerance: 1/8-inch maximum.
 - 5. Dimensions shall be reviewed and accepted by signage manufacturer prior to submittal of shop drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Warranty: Provide warranty documentation for signage.

1.7 QUALITY ASSURANCE

- A. Signage Contractor Qualifications: All sign fabrication within this section shall be performed by a signage contractor with the following:
 - 1. A minimum of five (5) years experience producing architectural signs, and a minimum of five (5) years experience producing compliant signs as specified in ANSI 117.1 (1986), Minimum Guidelines and Requirements for Accessible Design (MGRAD), Uniform Federal Accessibility Standards (UFAS) and American with Disabilities Act Accessibility Guidelines (ADAAG).
 - 2. A firm that employs skilled workers experienced in producing custom-fabricated products similar to those required for this Project and with at least seven years continuous experience under the current company name. Fabricator shall have a record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - 3. Fabricator shall have completed at least seven (7) similar signage projects having similar requirements within the last four (4) years for each signage type.
 - 4. 3M-certified printer and 3M-certified installer. Subcontracting to a 3M-certified printer is acceptable.
- B. Uniformity of Manufacturer: For each separate type of sign and graphic image required, obtain signs from a single manufacturer.
 - 1. Manufacturer's name, trade name, or trademark shall not appear on any visible surface.
- C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines. Comply with applicable provisions in ICC/ANSI A117.1.
- D. Fire Performance Characteristics: Provide wall coverings with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify wall coverings with appropriate markings of applicable testing and inspecting organization.
 - 1. Flame Spread: 5 or less.
 - 2. Smoke Developed: 25 or less.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, National Electrical Code, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- F. Aesthetic Requirements: Provide copy with straight and true edges; space characters as indicated; reproduce type style accurately with square corners and even curves; provide uniform letters and symbols; and provide smooth finishes with no visible imperfections.
- G. ADA Accessibility Guidelines: Signage shall comply with the ADA Accessibility Guidelines where applicable. Characters and graphics, including but-not limited to, copy height, letter stroke symbols, materials, and finishes indicated on the Drawings are intended as guidelines for compliance. Implement each applicable ADA guideline. Should conflicts arise, notify the Designer before proceeding.
- H. Inspections: The Architect reserves the right to periodically visit the Signage Contractor's facilities to inspect and review layouts.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage to signage. Store materials to permit easy access for inspection and identification.
 - 1. Keep aluminum off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect aluminum and packaged materials from corrosion and deterioration.
- B. Coordinate delivery and storage of sign materials with the Owner. Schedule delivery to minimize storage requirements.
- C. Store signage in a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity. Materials stored at the Project Site without prior approval of the Owner, may have to be relocated at the sign Signage Contractor's expense.

1.9 PROJECT CONDITIONS

- A. Weather Limitations for Exterior Signage: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Interior Environmental Limitations: Do not deliver and install glass graphics until spaces are enclosed and weathertight, wet work in spaces to receive murals is complete and dry, work above ceilings is complete, and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 1. Maintain a constant temperature not less than 60 deg F in installation areas for at least 10 days before and 10 days after installation.
- C. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.10 COORDINATION

- A. Signage Contractor is responsible for preparing a schedule indicating engineering, fabrication, delivery, installation, and final inspection of the work. Submit this schedule to the Architect and Owner for approval and coordination with other work at the Project Site.
- B. Installation:
 - 1. Coordinate installation with the Owner, Construction Manager, and other trades.
 - 2. For signs supported by or anchored to permanent construction, coordinate specific requirements for types and placement of anchorage devices and similar items to be used for attaching signs. Deliver such items to Project Site in time for installation.
 - 3. Signage Contractor is responsible for furnishing setting drawings, installation templates and directions for installing for appropriate blocking, anchorage devices, and electrical conduits.
 - 4. Signage Contractor to coordinate all appropriate blocking needed.

- C. Coordinate location of remote transformers with building construction. Ensure that any transformers are accessible after completion of work.

1.11 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. Failures include, but are not limited to, the following:
 - a. Deterioration of metal and polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS, GENERAL

- A. General: Use materials of size and thickness indicated or, if not indicated as required to produce strength and durability in finished product for use intended. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
- B. All materials shall be new stock, free from defects impairing strength, durability, and appearance. No fabrication or installation materials or procedures shall be used that will in any way change the usual quality or in any manner have an adverse effect on existing materials and surfaces.
- C. Graphic Content and Style: Provide sign copy that complies with requirements indicated in the Message Schedule on Drawings, and on artwork for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage. All digital prints to be high resolution output.
- D. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. Provide materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- E. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
 - 1. Plate and Sheet: ASTM B 209, Alloy 5005-H32 or Alloy 6061-T6.
 - 2. Material Gauge: Produce Fabricated Aluminum Signs with .090" faces and .063" returns.
 - 3. Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
 - 4. Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide SignComp Extrusions and Systems (877.784.0405) or approved comparable product.
 - 5. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), 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 6063-T5.
 - a. Mounting: Concealed studs, non-corroding for substrates encountered.
 - 6. Cutting: Computer guided lasers cut letters, logos or shapes.
 - 7. Construction: Cut letter returns from .063" coil (1", 1.5", 2", 3", 4", 5", 6") to size based on the desired letter depth, bent to the contour of the laser cut faces to produce a hollow-backed letter with 90° angle edges. Inside joints are MIG welded with 1"-1.5" intervals. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.
 - a. For Exterior Applications: Provide weep holes to drain water at lowest part of exterior signage. Equip weeps with permanent baffles to block light leakage without inhibiting drainage.
 - 8. Performance: Welds are tested for strength. Finishes are Salt Fog tested to ASTM B-117-95 for corrosion resistance.
 - 9. Finishes:

- a. Painted finish – DA sanded face & returns, primed, then sprayed; refer to "Coatings and Paintings" Paragraph.
- F. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVA (UV absorbing).
- G. Light Emitting Diodes (LEDs): Fabricated letters lit with 12-volt DC LEDs - optional lighting packages.
 - 1. Construction:
 - a. Face lit letters with outline and acrylic inserts.
 - b. Back (Halo) lit letters with clear or light-diffused polycarbonate backs.
 - 2. Removable cans or detachable stud options for mounting lit letters and allowing future servicing of LEDs.
 - 3. UL Listed Sign Sections with Class 2 power supplies, lead wires/cables, wiring diagrams and installation instructions supplied.
- H. Stainless Steel:
 - 1. Materials
 - a. High-Grade, Pre-Finished Stainless Steel Alloy #304
 - b. High-Grade, Pre-Finished Stainless Steel Alloy #316
 - c. Titanium-Coated Pre-Finished Stainless Steel Alloy #304
 - 2. Material Gauge: Fabricated Signs up to 24" are produced with 16 gauge faces and 24 gauge returns; Fabricated Signs greater than 24" are produced with 16 gauges faces and 22 gauge returns.
 - 3. Cutting: Computer guided lasers cut letters, logos or shapes.
 - 4. Construction: Sign returns are cut to size based on the desired sign depth and bent to the contour of the laser cut faces to produce a hollow-backed letter with 90° angle edges. Solder inside joints with a continuous bead of lead-free silver solder.
 - 5. Performance: Solder joints indicate the ability to withstand temperatures from -40°F to 220°F. Salt Fog tested to ASTM B117-95 for corrosion resistance.
 - 6. Finish Options:
 - a. 304 Stainless Steel:
 - 1) Polished #8 finish: pre-finished sheet, face and/or returns, no clear coating.
 - 2) #4 Soft Satin: pre-finished sheet with 150-180 grit (vertical grain standard, horizontal optional), face and/or returns, no clear coating.
 - 3) Vibration finish: pre-finished sheet with simulated bead blasted face and/or return. no clear coating.
 - 4) Random Arc: pre-finished sheet with random arcs (swirls in material) face and/or returns, no clear coating.
 - b. 316 Stainless Steel (more corrosion resistant-recommended for coastal installations):
 - 1) Polished #8 finish, pre-finished sheet, face and/or returns, no clear coating.
 - 2) #4 Soft Satin, pre-finished sheet with 150-180 grit (vertical grain standard, horizontal optional), face and/or returns, no clear coating.
 - 7. Mounting: Provide manufacturer's hardware for projection mounting of characters at distance from wall surface indicated on drawings. Concealed studs, non-corroding for substrates encountered.
- I. Steel:
 - 1. 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.
 - 2. Steel Channels, Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 3. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
 - 4. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
 - 5. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.2 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Acrylic Sheet Finishes
 - 1. 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.
- E. Coatings and Paints: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.
 - 1. Baked Enamel:
 - a. Exposed panel finish: Deterioration includes, but is not limited to, the following:
 - 1) Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - 2) Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - 3) Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Clear Anodic Finish:
 - a. Manufacturer's standard Class 1 clear anodic coating, 0.018 mm or thicker, over a satin (directionally textured) mechanical finish, complying with AAMA 611.
 - 3. Industrial Paint Finish:
 - a. Basis of Design: Provide acrylic polyurethane "MAP-LVG Ultra Low VOC" by Matthews Paint Company or a comparable product submitted to and accepted by Architect with the following product characteristics.
 - 1) Finish: Satin
 - b. Finished coated surface shall provide a minimum of 150 in/lbs of impact resistance on all exposed faces.
 - c. All edges and faces shall have a seamless finish unless indicated otherwise on drawings.
 - 4. Overcoat/Topcoat:
 - a. Basis of Design Products: Subject to compliance with requirements, provide "Clear Diamond Finish" by KBS or a comparable product with the following criteria proposed to and accepted by Architect prior to bidding.
 - 1) Provide: Two topcoats for interior locations, Three topcoats for exterior locations.

2.3 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.
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
 - 2. Exposed Metal-Fastener Components, General:
 - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
 - b. Fastener Heads: For nonstructural connections, use oval countersunk screws and bolts with tamper-resistant, Allen-head slots unless otherwise indicated.
- B. Visible studs shall have sleeves painted to match color specified by Architect.

2.4 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.
 - 1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
 - 2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
 - 3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
 - 4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

5. Internally brace signs for stability and for securing fasteners.
6. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing

2.5 FABRICATED CHARACTERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 1. Gemini Incorporated.
 2. Lawrence Sign Up.
 3. Seemore Signs.
 4. Star Signs, Inc.
 5. Young Sign Company.
- B. Refer to Article 2.1 for material technical information.
 1. Material: High-Grade
- C. Non-illuminated Fabricated Channel Characters (101400.A10): Fabricate sign to the required sizes and styles, using metals and thicknesses indicated in article 2.1 "MATERIALS, GENERAL." Form exposed faces and sides of characters to produce surfaces free from warp and distortion, sharp corners and precisely forms lines and profiles. Include internal bracing for stability and attachment of mounting accessories. Comply with the following requirements:
 1. Finish
 - a. Stainless Steel:
 - 1) As selected by Architect.
 2. Refer to Drawings for:
 - a. Sign Height, Width and Depth
 - b. Typeface and Character Spacing
 - c. Color
 - d. Mounting Position
 3. Welding: Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.
 4. Weeps: Provide weep holes to drain water at lowest part of exterior characters. .
- D. Illuminated – Halo Lit Fabricated Channel Characters (101400.A12): Fabricate sign to the required sizes and styles, using metals and thicknesses indicated below with LEDs (Light-emitting diodes) including transformers, insulators, and other accessories for operability, with provision for servicing and concealing connections to building electrical system. Form exposed faces and sides of characters to produce surfaces free from warp and distortion, sharp corners and precisely forms lines and profiles. Include internal bracing for stability and attachment of mounting accessories. Use tight or sealed joint construction to prevent unintentional light leakage. Space lamps apart from each other and away from character surfaces as needed to illuminate evenly. Comply with the following requirements:
 1. Power: As required for illumination indicated on drawings, coordinate with electrical drawings. Conceal all transformers and coordinate access with Architect.
 2. Material:
 - a. Sign Face & Returns:
 - 1) Pre-Finished Stainless Steel Alloy #316 (corrosion resistant)
 - b. Translucent Sign Back: provide polycarbonate [[OR ACRYLIC]] sheet, manufacturer's standard thickness for size of sign. Attach to sheet metal back channels.
 3. Finish
 - a. Stainless Steel:
 - 1) As selected by Architect.
 4. Refer to Drawings for:
 - a. Sign Height, Width and Depth
 - b. Typeface and Character Spacing

- c. Color
- d. Mounting Position
- 5. Welding: Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surface.
- 6. Weeps: Provide weep holes to drain water at lowest part of exterior characters. Equip weeps with permanent baffles to block light leakage without inhibiting drainage.

2.6 FLAT CUT

- A. General: Flat Cut
 - 1. Custom (101400.A31).
- B. Flat cut characters and shapes with uniform faces; square-cut, smooth, eased edges; precisely formed lines and profiles; and as follows:
 - 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. APCO Graphics, Inc.
 - b. R. K. Ramos Signage Systems.
 - c. ASI Sign Systems, Inc.
 - d. Dimensional Innovations.
 - e. Gemini Incorporated.
 - f. Metallic Arts.
 - g. Square One.
- C. Refer to Drawings for:
 - 1. Sign Height, Width and Depth.
 - 2. Typeface and Character Spacing.
 - 3. Color.
 - 4. Mounting Position.
- D. Mounting: As indicated on Drawings.
- E. Refer to Article 2.1 "Materials" for material technical information.
- F. Refer to Article 2.2 "Finishes" for materials selected below.
- G. Material selection:
 - 1. ACRYLIC
 - a. Fabricate flat-cut-out characters and shapes from cast acrylic sheets of thickness as indicated on drawings.

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 sign-support surfaces are within tolerances to accommodate signs.
- C. Verify that anchor inserts are correctly sized and located to accommodate signs.
- D. Verify that items provided under other sections of Work are sized and located to accommodate signs.
- E. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

- G. Field verify dimensions of all conditions.

3.2 INSTALLATION, GENERAL

A. Preparation

1. Acclimatize materials by removing them from packaging in the installation areas not less than 24 hours before installation.
2. Follow manufacturer's printed instructions for surface preparation.
 - a. Prepare substrates to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, and defects.
 - b. Painted surfaces: Treat areas susceptible to pigment bleeding.
 - c. Metals: If not factory-primed, clean and apply rust inhibitive zinc primer.
 - d. Moisture content: maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - e. Adhesion Test: Perform manufacturer's standard non-destructive adhesion test on substrate, prime or repaint all surfaces that fail adhesion test as recommended by manufacturer.

B. 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 of sign without encountering protruding objects or standing within swing of door.

C. Wall-Mounted Signs on Smooth Surfaces: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces. Where signage is located on exterior surfaces, provide exterior rated adhesive as recommended by signage manufacturer for substrate indicated.

D. Vertical Tolerance: Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1m).

E. Installation - Fabricated Signage

1. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
 - a. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - 1) Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - 2) Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
 - b. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - 1) Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
 - 2) Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.
 - c. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position so that signage is correctly located and aligned.

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.
- B. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes to components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- C. Remove temporary protective coverings and strippable films as signs are installed.
- D. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean conditions during construction and protect from damage until acceptance by Owner.

END OF SECTION 101400

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SECTION 101423 - ADA AND CODE SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Wayfinding Panel Signage (101423.A01):
 - a. Interior Room signage.
 - b. Custom fabricated polymer plastic signage.
- B. Related Sections include the following:
 - 1. Section 012100 "Allowances" for interior room signage and exterior door signage.
 - 2. Section 015000 "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.
 - 3. Section 101400 "Signage" for related graphics and signage.
 - 4. Division 26 Section "Interior Lighting" and "Exterior Lighting" for illuminated signs.

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."
- B. Signage Contractor: Contractor responsible for the fabrication and installation of signage unless responsibility for fabrication or installation is called out by others in the drawings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Including but not limited to, the following:
 - 1. Manufacturer's technical product data for each type of product specified. Include data on physical characteristics, durability, fade resistance, flame resistance and manufacturing process.
 - 2. Product data shall show compliance with requirements for fire performance characteristics and physical properties.
- 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, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
 - 3. Include fabrication and installation details, and attachments to other work.
 - 4. Include elevations, component details, and attachments to other work for wayfinding signage.
 - 5. Indicate materials and profiles of signage fittings, joinery, finishes, fasteners, anchorages, and accessory items.
 - 6. Field Dimensions shall be obtained, reviewed, and accepted by signage manufacturer prior to submittal of shop drawings.
- 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. Aluminum.
- D. Samples for Verification:
 - 1. Sample from same flitch to be used for the Work, with specified finish applied.
 - 2. Submit full-size samples of wayfinding signage. Quantity and type shall be determined by Architect with intent of one sample per each signage type representative of all types of products indicated.
- E. Sign Schedule: Use same designations indicated on Drawings.

- F. Mockups/Field Samples: Build mockups/field samples to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Warranty: Special warranty specified in this Section.
- C. Provide written documentation that the braille translation included on the manufacturer's signage provided in this section has been evaluated by the American Foundation for the Blind, and is, in their opinion, correct and compliant with ADAAG.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Fabricator Qualifications: A firm that employs skilled workers experienced in producing custom-fabricated products similar to those required for this Project and with at least seven years continuous experience under the current company name. Fabricator shall have a record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - 1. Fabricator shall have completed at least seven (7) similar signage projects having similar requirements within the last four (4) years for each signage type.
- C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- D. Regulatory Requirements: Comply with applicable provisions in ICC A117.1.
- E. Fire Performance Characteristics: Provide wall coverings with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify wall coverings with appropriate markings of applicable testing and inspecting organization.
 - 1. Flame Spread: 5 or less.
 - 2. Smoke Developed: 25 or less.
- F. Accessibility Guidelines: Signage shall comply with ICC A117.1 where applicable. Characters and graphics, including but-not limited to, copy height, letter stroke symbols, materials, and finishes indicated on the Drawings are intended as guidelines for compliance. Implement each applicable ADA guideline. Should conflicts arise, notify the Designer before proceeding.

1.7 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.
 - 1. Required parties include the contractor, sub-contractor and architect/designer.
 - 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 temporary protection requirements for during and after installation.

1.8 PROJECT CONDITIONS

- A. Weather Limitations for Exterior Signage: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Interior Environmental Limitations: Do not deliver and install vinyl wall graphics until spaces are enclosed and weathertight, wet work in spaces to receive murals is complete and dry, work above ceilings is complete, and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 1. Maintain a constant temperature not less than 60 deg F in installation areas for at least 10 days before and 10 days after installation.
- C. Lighting: Do not install vinyl wall graphics until permanent level of lighting is provided on the surfaces to receive murals.
- D. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by the vinyl wall graphics manufacturer for full drying and curing.
- E. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install ADA and Code Signage units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage to signage. Store materials to permit easy access for inspection and identification.
- B. Store signage in a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

1.11 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.
- B. For signage 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.

1.12 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. Failures include, but are not limited to, the following:
 - a. Deterioration of metal and polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 MATERIALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. Provide materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
 - 1. Plate and Sheet: ASTM B 209, Alloy 3003-H14, Alloy 5005-H32 or Alloy 6061-T6.
 - 2. Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
 - 3. Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- D. PETG (Polyethylene Terephthalate Glycol) Sheet: ASTM D 5047-17 category as standard with manufacturer for each sign.
 - 1. Tensile Strength: 7,700 lbf/sq. in. per ASTM D 638.
 - 2. Flexural Modulus of Elasticity: 310,000 lbf/sq. in. per ASTM D 790.
- E. Photopolymer Sheet: Manufacturer's recommended photopolymer for producing integral non-laminated raised copy.
- F. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, ASTM C 1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), coated on both surfaces with abrasion-resistant coating:
 - 1. Impact Resistance: 16 ft-lbf/in. per ASTM D 256, Method A.
 - 2. Tensile Strength: 9000 lbf/sq. in. per ASTM D 638.
 - 3. Flexural Modulus of Elasticity: 340,000 lbf/sq. in. per ASTM D 790.
 - 4. Heat Deflection: 265 deg F at 264 lbf/sq. in. per ASTM D 648.
 - 5. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044.
- G. Expanded PVC Sheet: Subject to compliance with requirements, provide "Sintra" by 3A Composites.
 - 1. Material: Moderately expanded closed-cell polyvinyl chloride.
 - 2. Color: As selected by Architect from manufacturer's full range.
- H. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.3 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Aluminum Finishes
 - 1. Clear Anodic Finish: Manufacturer's standard Class 1 clear anodic coating, 0.018 mm or thicker, over a satin (directionally textured) mechanical finish, complying with AAMA 611.
- E. Acrylic Sheet Finishes
 - 1. 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.

2.4 ACCESSORIES

- A. Mounting Methods: Use double sided vinyl tape and silicone adhesive fabricated from materials that are not corrosive to sign materials and mounting surface.
- B. 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.
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
 - 2. Exposed Metal-Fastener Components, General:
 - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
 - b. Fastener Heads: For nonstructural connections, use oval countersunk screws and bolts with tamper-resistant, Allen-head slots unless otherwise indicated.

2.5 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.
 - 1. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
 - 2. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
 - 3. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.
 - 4. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Sign Message Panels: Construct sign-panel surfaces to be smooth and 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.
 - 1. Increase panel thickness or reinforce with concealed stiffeners or backing materials as needed to product surfaces without distortion, buckles, warp, or other surface deformations.

2.6 WAYFINDING PANEL SIGNAGE – ROOM SIGNAGE (101423.A01)

- A. General: Panel signs shall be acrylic or photopolymer signs with insert window, with an overall thickness of approximately 5/16 inch. Existing signs were constructed as follows:
 - 1. Provide back sheet of 1/8 inch thick acrylic with first surface painted.
 - 2. Provide 1/16 inch spacer for insert window.
 - 3. Provide 1/8 inch thick photopolymer with first surface painted.
 - 4. Provide painted edges for solid appearance.
 - 5. Provide white raised numbers and braille, unless otherwise indicated or required by code.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ad Trends.
 2. APCO Signs.
 3. ASI Sign Systems, Inc.
 4. Fast Signs.
 5. Gemini.
 6. Howard Industries.
 7. Innerface Architectural Signage, Inc.
 8. Modulex.
 9. Nova Polymers.
 10. Star Signs.
 11. Take Form.
 12. 2/90 Sign Systems.
- C. 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 measured diagonally from corner to corner.
- D. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of slide-in inserts.
- E. 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. Raised-Copy Thickness: Not less than 1/32 inch.
- F. Subsurface Copy: Apply minimum 4-mil- thick vinyl copy to back face of clear acrylic sheet forming panel face to produce precisely formed opaque image. Image shall be free of rough edges.
- G. Colored Coatings for Acrylic Sheet: For copy background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are UV and water resistant for five years for application intended.
1. Color: As selected by Architect from manufacturer's full range.

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 sign-support surfaces are within tolerances to accommodate signs.
- C. Verify that anchor inserts are correctly sized and located to accommodate signs.
- D. Verify that items provided under other sections of Work are sized and located to accommodate signs.
- E. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.
- G. Field verify dimensions of all conditions.

3.2 INSTALLATION, GENERAL

- 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 of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.
 - C. Wall-Mounted Signs on Smooth Surfaces: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 1. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces. Where signage is located on exterior surfaces, provide exterior rated adhesive as recommended by signage manufacturer for substrate indicated.
 - D. Wall-Mounted Signs on Textured Surfaces: Comply with sign manufacturer's written instructions except where more stringent requirements apply. Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
 - E. Vertical Tolerance: Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1m)

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.
- B. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes to components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- C. Remove temporary protective coverings and strippable films as signs are installed.
- D. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean conditions during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

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SECTION 102113 - TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Phenolic toilet compartments configured as toilet enclosures (102113.A01- Type 1).
 - 2. Phenolic urinal screens (102113.A02).
- B. Related Sections:
 - 1. Section 061000 "Rough Carpentry" for blocking.
 - 2. Section 102116 "Shower and Dressing Compartment"
 - 3. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, and similar accessories.

1.2 COORDINATION

- A. Coordinate requirements for blocking, reinforcing, and other supports concealed within walls.

1.3 ACTION 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: For toilet compartments and urinal screens. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show layout and size of each toilet compartment.
 - 2. Show layout and size for each urinal screen.
 - 3. Show locations of cutouts for compartment-mounted toilet accessories.
 - 4. Show locations of centerlines of toilet fixtures.
 - 5. Show locations of floor drains.
 - 6. Show degree of openness for each door swing as unoccupied.
- C. Samples for Initial Selection: For each type of unit indicated. Include Samples of compartment material involving texture 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, texture, and finish required for units, prepared on 6-inch- square Samples of same thickness and material indicated for Work.

1.4 CLOSEOUT SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has five years of similar installations.
- B. Source Limitations: For products listed in the Part 2 articles, obtain products from single source from single manufacturer.

1.6 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.

1.7 WARRANTY

- A. Guarantee entire installation for a period of two years from date of project Substantial Completion against defects in material and workmanship. Guarantee covers repair or replacement, with no costs to the Owner, of any and all items which become defective within the 10-year period.
 - 1. [WARRANTY INFO
 - a. ASI - Accurate Partitions
 - 1) Black Core/Color-Thru Phenolic: Twenty-five (25) years against delamination, breakage or corrosion
 - b. BRADLEY
 - 1) Phenolic - 3 years against delamination and discoloration.
 - c. GENERAL PARTITIONS
 - 1) Phenolic – 15 years
 - d. METPAR EXAMPLE
 - 1) Phenolic – Color Thru - 15 years

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Surface-Burning Characteristics: Comply with ASTM E 84 requirements for Class "C" or better; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index:
 - a. Class A flame spread/smoke developed 25 or less.
 - b. Class B flame spread/smoke developed rating 75 or less.
 - c. Class C flame spread/smoke developed rating 200 or less.
 - 2. Smoke-Developed Index: 450 or less.
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 PHENOLIC TOILET COMPARTMENTS – (102113.A01- TYPE 1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Bradley Corporation - Phenolic "Mills Partitions" for toilet enclosure units/urinal screens or comparable product by one of the following:
 - 1. ASI Accurate Partitions;
 - 2. General Partitions Mfg. Corp.
 - 3. Knickerbocker Partition Corporation.
 - 4. Metpar Corp.
- B. Toilet-Enclosure Style: Sentinel Series 400 - Floor-mounted overhead braced.
 - 1. Compartment Depth and Width: As scheduled and indicated on Drawings.
 - 2. Door Width: As scheduled and indicated on the Drawings.
 - 3. Height Above Floor: 12 inches (305 mm).
 - 4. Door/Panel Height: 58 inches
 - 5. Pilaster Height: As scheduled and indicated on Drawings.

- C. Urinal-Screen Style: Wall mounted with continuous brackets.
 - 1. Height above floor as indicated on drawing.
- D. Door, Panel, Screen, and Pilaster Construction: Solid, color through phenolic panel material on both faces, seamless, with eased edges, "no-sightline system" and with homogenous color and pattern throughout thickness of material.
 - 1. Material Thicknesses:
 - a. Doors, Pilasters: 3/4 inch.
 - b. Panels, Urinal Screen: 1/2 inch.
 - c. Compartments shall incorporate a lap joint at latch stile of doors and adjacent pilasters to eliminate sightlines into stalls.
 - 2. Color and Pattern: One color, pattern and texture in each room.
 - a. Color and Pattern: As selected by Architect from manufacturer's full range.
 - 3. Provide "No-sightline" lap joint system.
- E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design. Type 304 stainless steel, No. 4 satin finish.
- F. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's continuous design. Type 304 stainless steel, No. 4 satin finish.
- G. Color: Friston Ash

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
 - 1. Material: Clear-anodized aluminum or stainless steel.
 - 2. Hinges: Provide heavy-duty, continuous stainless steel hinges with cover. Hinges shall be spring-loaded, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
 - 3. Latch and Keeper: Manufacturer's standard 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.
 - a. Coordinate design of door and latch to provide "no-sight line" configuration.
 - b. Type 1 Latch and Keeper: Manufacturer's standard stainless-steel 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. Intent is to match existing.
 - c. Type 2 Latch: Manufacturer's standard stainless-steel occupancy indicator latch. Latch to be mounted to the pilaster with integrated function as keeper for in-swinging doors. Latch will provide emergency access through an accessible slotted center pin in the external indicator.
 - 4. Occupancy Indicator Latch and Keeper: Surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units showing green and red occupancy indicators. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
 - 5. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
 - 6. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
 - 7. 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 or chrome-plated steel or brass, finished to match the items they are securing, with vandal-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.

2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless-Steel Castings: ASTM A 743/A 743M.
- E. Phenolic material comprised of multiple layers of melamine resin impregnated kraft paper, and a decorative surface sheet on both faces. All layers shall be fused together under high temperature and pressure.

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. Floor-Mounted 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.
 - 1. Each pilaster over 3 inches wide shall be anchored to floor with a minimum of two (2) anchors to prevent twisting.
 - 2. Overhead Bracing shall not be installed over open stall areas. At areas where additional overhead support is necessary, consult with architect to provide alternate means of support.
- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- wide, in-swinging doors for standard toilet compartments and 36-inch- wide, out-swinging doors with a minimum 32-inch- 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 inch.
 - b. Panels and Walls: 1 inch.
 - 2. Brackets: Secure panels to walls and to pilasters with continuous brackets.
 - a. Locate wall brackets 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 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. Urinal Screens: Attach screens to pilasters and walls with continuous brackets and anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

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.
- B. Clean exposed surfaces of compartment systems using materials and methods recommended by manufacturer and provide protection as necessary to prevent damage during remainder of construction period.

3.4 FINAL PROTECTION

- A. Provide final protection and maintain conditions the ensure toilet compartments and screens are without damage and deterioration at time of Substantial Completion.
- B. If any damage occurs, replace unit(s), unless repairs acceptable to Architect can be made.
- C. Should damage occur to partition, door or pilaster in shipping, those damaged items shall be replaced within 30 days.

END OF SECTION 102113

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SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Corner Guards (102600.A03).
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for metal armor, kick, mop, and push plates.
 - 2. Section 092900 "Gypsum Board" for corner trim included in gypsum board installation.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- B. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Corner Guards: 12 inches long.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

1.4 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.
- B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Section 01 40 00 "Quality 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.
- C. Preinstallation Conference: Conduct conference at Project site.

1.6 MOCKUPS

- A. Mockups/Field Samples: Build mockups/field samples, to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Field Samples: Build field sample/mockup of typical wall areas as shown on Drawings.
 - a. Note: Mockup shall be a field sample of corner guard, baseboard, and adjacent areas in Project. Architect and manufacturer's representative will observe installation of first corner guard installation at Architect's selected location.
- B. Field testing shall be performed on field sample areas according to requirements in "Field Quality Control" Article.
- C. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. 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.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.

2.2 POLYCARBONATE CORNER GUARDS (102600.A03 - **CG1**):

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Construction Specialties Acrovyn; "LG Series" or comparable product submitted prior to bidding. Tested per ASTM E84 Class A/1..
 1. Model No: LG-200 - 90 Degree; LG-200 M for Odd-angles.
 - a. Material: Extruded, clear polycarbonate with an impact resistance of 16ft lb/inch per ASTM-D256.
 - b. Thickness: 0.10 inches
 - c. Profile: Nominal 2-inch- long leg.
 - d. Height: 8'-0". Install from stop of base unless otherwise indicated on drawings.
 2. Fasteners: All fasteners to be non-corrosive and compatible with polycarbonate. All necessary hardware to be supplied by the manufacturer.

2.3 FABRICATION

- A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.
 1. Provide surfaces free of chips, dents, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION AND CLEANING

- A. General: Install impact-resistant wall protection units plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
 - 1. Install wall protection units in locations and at mounting heights indicated on Drawings.
 - 2. Provide mounting hardware, anchors, and other accessories required for a complete installation.
 - a. Provide anchoring devices to withstand imposed loads.
- B. Immediately after completion of installation, clean plastic covers and accessories as recommended by corner guard manufacturer.

END OF SECTION 102600

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SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

TOILET, BATH, AND LAUNDRY ACCESSORIES

1.1 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.
 - a. Toilet Tissue Dispenser (102800.A01).
 - b. Paper Towel Dispenser (102800.A02).
 - c. Waste Receptacle 102800.A03).
 - d. Soap Dispenser (102800.A05).
 - e. Grab Bar (102800.A06).
 - f. Sanitary Napkin Receptor Unit (SNR) (102800.A08).
 - g. Mirror Unit (102800.A10).
 - 2. Public-use shower room accessories:
 - a. Shower Curtain (102800.A11).
 - b. Folding Shower Seat (102800.A12).
 - c. Coat Hook (102800.A15).
 - 3. Accessories:
 - a. Diaper Changing Station (102800.A20).
 - b. Under Lavatory guards (102800.A21).
 - c. Utility Shelf (102800.A22).
 - d. Mop and Broom Holder (102800.A23).
- B. Related Sections:
 - 1. Section 061000 "Rough Carpentry" for blocking required behind fixtures and accessories.
 - 2. Section 102113 "Toilet Compartments".
 - 3. Division 22 for plumbing fixtures and related accessories.
- C. Owner will furnish, and contractor install the following accessories:
 - 1. Toilet tissue dispensers.
 - 2. Paper towel dispensers.
 - 3. Soap dispensers.
- D. Owner will furnish and install the following accessories:
 - 1. Waste receptacles.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
 - 5. Manufacturer's warranty.
 - 6. Include electrical characteristics.
- B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify products using designations indicated.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.
- B. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

1.5 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.
 - 1. Where cutouts are required in other work, provide templates, substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

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 Substantial 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 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/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 minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 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).

- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products specified from Bobrick Washroom Equipment, Inc. or comparable products by one of the following:
 - 1. American Specialties, Inc.
 - 2. Bradley Corporation.
- B. Toilet Tissue Dispenser (102800.A01 - TTD) – Provided by Owner, Installed by Contractor.
- C. Paper Towel Dispenser (102800.A02 - PTD) – Provided by Owner, Installed by Contractor.
- D. Soap Dispenser (102800.A05 - SD) – Provided by Owner, Installed by Contractor.
- E. Grab Bars – GB, VGB, FGB (102800.A06):
 - 1. Bobrick:
 - a. B-6806.99; 36" 42" & 18" at Accessible Toilet Stalls.
 - b. B-6806.99; 18" & B-5861.99 at Shower.
 - c. B-6806.99; Series Wall-to-Floor Bar w/ bottom rail at DFs w/out Alcove.
 - d. FGB: B-4998.99 at Accessible Toilet and Shower Stall.
 - e. B-819298 Drinking Fountain Grab Bar; 33" height, projects 18" from the wall.
 - 2. Bradley:
 - a. 832-2 Series; 36" 42" & 18" at Accessible Toilet Stalls.
 - b. 832-2 Series; 18" & 16"x30" Horizontal Two-Wall Bar at Shower Stall.
 - c. 832-2 Series; Wall-to-Floor Bar w/ bottom rail at DFs w/out Alcove.
 - d. FGB: 8370-107-2 at Accessible Toilet and Shower Stall.
 - 3. ASI:
 - a. 3800-P Series; Type 01 36" 42" & 18" at Accessible Toilet Stalls.
 - b. 3800-P Series; Type 01 18" & Type 60 at Shower Stall.
 - c. 3800-P Series; Type 75 at Drinking Fountains without Alcove.
 - d. FGB: 3413-P at Accessible Toilet and Shower Stall.
- F. Sanitary-Napkin Receptor Unit (102800.A08 - SNR):
 - 1. Basis of Design Products:
 - a. Bradley: Model 4721-15 & 4722-15.
 - b. ASI: Model 0473-1A & 0472-1.
 - 2. Mounting: Surface.
 - 3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
 - 4. Receptacle: Removable.
 - 5. Material and Finish: Stainless steel, No. 4 finish (satin).
- G. Mirror Unit (102800.A10 – M1):
 - 1. Basis-of-Design Products:
 - a. Bobrick Washroom Equipment, Inc.; B-290 Series.
 - b. ASI: Model 0600.
 - 2. Types:
 - a. M1 – Shall be 18-inches wide x 36-inches height.
 - 3. Frame Stainless-steel channel, in No.4 satin finish.
 - 4. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. Concealed wall hanger bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
 - b. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
 - 5. Glazing: Provide polished tempered glass mirror in locker rooms and gym facilities. Provide polished non-tempered glass mirror in other locations unless noted otherwise.

6. Sizes: As indicated on Drawings.

2.4 PUBLIC-USE SHOWER ROOM ACCESSORIES

- A. Source Limitations: Obtain public-use shower room accessories from single source from single manufacturer.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product specified or comparable product by one of the following:
 1. American Specialties, Inc.
 2. Bradley Corporation.
- C. Shower Grab Bar (102800.A06 – SGB):
 1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.;
 - a. Type 1 - B-6861.99 Series.
 - b. Type 2 – B-5837.99
 2. Mounting: Flanges with concealed fasteners.
 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
 4. Outside Diameter: 1-1/2 inches.
 5. Configurations and Lengths for two wall bar:
 - a. Type 1 - 15-7/8" x 30-7/8".
 - b. Type 2 – 36" x 54".
- D. Shower Curtain and Shower Rod (102800.A11 – SC & SCR):
 1. Shower Curtain: Basis-of-Design: Bobrick B 204-2.
 - a. Curtain Size: Minimum 42 inches by 72 inches high.
 - b. Curtain Material: Nylon reinforced vinyl, minimum 0.008 inch (0.2 mm) thick, opaque, matte, with integral antibacterial agent, self-deodorizing, and flame retardant.
 - c. Curtain Color: White.
 - d. Curtain Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
 2. Shower Curtain Hooks: Basis-of-Design: Bobrick B 204-1.
 - a. Description: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.
 3. Shower Rod : Basis-of-Design: Bobrick B-6047.
 - a. Description:
 - 1) 1-1/4-inch OD; fabricated from nominal 0.05-inch-thick stainless steel.
 - 2) Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
 - 3) Finish: No. 4 (satin) finish.
- E. Folding Shower Seat (102800.A12 - FSS):
 1. Configuration: L-shaped seat, designed for wheelchair access.
 2. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
 3. Mounting Mechanism: Stainless steel, No. 4 finish (satin).
 4. Acceptable models from listed manufacturers:
 - a. Bobrick; B-518, reversible to suit configuration indicated.
 - b. Bradley; 9594, reversible to suit configuration indicated.
 - c. ASI 8206R or 8206L, to suit configuration indicated.
- F. Coat Hook (102800.A15):
 1. Description: Double-prong unit.
 2. Material and Finish: Stainless steel, No. 4 finish (satin).
 3. Basis-of-Design Product: Bobrick; Model B-6727.

2.5 CHILDCARE ACCESSORIES

- A. Source Limitations: Obtain childcare accessories from single source from single manufacturer.
- B. Diaper-Changing Station (102800.A20 - DCS):

1. Basis-of-Design Product: Subject to compliance with requirements, provide, Koala Kare Products; Model KB300-SS, Color 01 Grey. Comparable products from other manufacturers meeting specified requirements will be considered when submitted to and accepted by Architect prior to bidding.
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
3. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: HDPE in manufacturer's standard grey color with stainless steel veneer inset in front surface having a No. 4 finish (brushed satin).
6. Unit shall have Microban antimicrobial additive embedded into the bed surface.
7. Unit shall conform to ASTM F 2285-04 "Standard Safety performance Specification for Diaper Changing Tables for Commercial Use".
8. Warranty: Manufacturer's Five years limited warranty.

2.6 UNDER-LAVATORY GUARDS

- A. Under-lavatory Guard (102800.A21):
 1. Refer to Division 22 "Plumbing" for additional specification information.
 2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
 3. Material and Finish: Antimicrobial, molded plastic, white.

2.7 CUSTODIAL ACCESSORIES

- A. Utility Shelf – SH (102800.A22 - SH):
 1. Basis of Design Products:
 - a. Bobrick: B-298x18.
 - b. Bradley: 758-18 Series.
 - c. ASI: 0692-818.
 2. Dimensions: Depth- 8" x Length - 18".
 3. Finish: Satin Stainless Steel.
- B. Mop and Broom Holder with Shelf (102800.A23 - MBH):
 1. Description: Unit with shelf, hooks and mop/broom holders.
 2. Length: 34 inches.
 3. Hooks: Four.
 4. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
 5. Material and Finish: Stainless steel, No. 4 finish (satin).
 6. Acceptable models from listed manufacturers.

2.8 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 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 recommendations.

END OF SECTION 102800

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire protection cabinets for the following:
 - a. Portable fire extinguishers.
 - 1) Provide fire extinguishers for each fire extinguisher cabinet, except where indicated as bracket-mounted.
- B. Related Requirements:
 - 1. Section 104416 "Fire Extinguishers."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

1.5 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
 - 1. Coordinate sizes and locations of fire protection cabinets with wall depths

1.6 SEQUENCING

- A. Apply vinyl lettering on field-painted, fire protection cabinets after painting is complete.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
 - 1. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.

- a. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Color: As selected by Architect from manufacturer's full range.
- B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
 - 1. Sheet: ASTM B 209 (ASTM B 209M).
 - 2. Extruded Shapes: ASTM B 221 (ASTM B 221M).
- C. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm thick.

2.2 FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Basis of Design Products: Subject to compliance with requirements provide Larsen's Manufacturing Company; Architectural Series products from:
 - a. Larsen's Manufacturing Company; Architectural Series.
 - b. Amerex.
 - c. J. L. Industries, Inc., a division of Activar Construction Products Group.
 - d. Potter Roemer LLC.
 - e. Comparable products from other manufacturers may be used when submitted to and accepted by Architect prior to bidding.
 - 2. 104413.A13 - Steel Cabinet with Aluminum Trim and Door, Non-rated, Semi-recessed. 2-1/2" Rolled.
 - a. Type 13: Semi-recessed Non-rated Cabinets: Larsen's Manufacturing Company; Architectural Series, Model AL-2409-6R.
- B. Cabinet Material: Steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- C. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.
 - 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- D. Cabinet Trim Material: Same material and finish as door.
- E. Door Material: Aluminum.
- F. Door Style: Vertical duo panel with frame.
- G. Door Glazing: Tempered break glass, clear.
- H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch.
 - 2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- I. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
 - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color:
 - (a) Red.
 - 4) Orientation: Vertical.

- J. Cabinet Finish:
 - 1. Manufacturer's standard baked-enamel paint for the following:
 - a. Interior of cabinet, white.
 - 2. Interior of cabinet to match exterior.
 - 3. Door and Trim: Match fire extinguisher door face finish.

2.3 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Provide factory-drilled mounting holes.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
 - 1. Fabricate door frames of one-piece construction with edges flanged.
 - 2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 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 finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. 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.

2.5 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.6 STAINLESS STEEL FINISHES

- A. Provide #4 finish on 304 stainless steel.

2.7 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning". After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- B. Baked-Enamel or Powder-Coat Finish: Interior box finish, immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
- C. Identification: Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- C. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- D. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Six years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Larsens Manufacturing Company.
 - d. Potter Roemer LLC.
 - e. Comparable products from other manufacturers may be used when submitted to and accepted by Architect prior to bidding.

2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type (104416.A01): UL-rated 4-A:80-B:C, 10 lbs. nominal capacity, with mono-ammonium phosphate-based dry chemical in manufacturer's standard enameled container.
- C. Wet-Chemical Type (104416.A02) Bracket Mounted: UL-rated 2-A:1-B:C:K, 1.6 gal. nominal capacity, with potassium acetate-based chemical in stainless-steel container, with pressure indicating gage.

2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 1. Mounting Brackets: 48 inches above finished floor to top of fire extinguisher.
- C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following types of roller shades:
 - 1. Manually operated roller shades with single rollers (122413.A01).
- B. Related Sections include the following:
 - 1. Section 012300 "Alternates" for alternates effecting work of this Section.
 - 2. Section 061000 "Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
 - 3. Section 079200 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations. Show location and type of each roller shade.
 - 1. Include elevations, sections details, and dimensions not shown in Product Data.
 - 2. Include operational clearances, attachments to and relationship to adjoining work.
- C. Samples for Initial Selection: For each type and color of shadeband material.
 - 1. Include Samples of accessories involving color selection.
 - 2. Include 4 inch square, actual samples of each type of shadeband material for Architect's selection.
- D. Samples for Verification: For each type of roller shade.
 - 1. Shadeband Material: Not less than 10 inches square. Mark interior face of material if applicable.
 - 2. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.
 - 3. Installation Accessories: Full-size unit, not less than 10 inches long.
- E. Product Schedule: For roller shades. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of shadeband material.
- C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining roller shades and finishes.
 - 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 - 3. Operating hardware.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Source Limitations: Obtain roller shades through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials 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:
 - 1. Flame-Resistance Ratings: Passes NFPA 701.
- D. Product Standard: Provide roller shades complying with WCMA A 100.1.
- E. Anti-Microbial Characteristics: 'No Growth' per ASTM G21 results for fungi ATCC9642, ATCC9644 AND ATCC9645.
- F. Field Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, lead-free designation, and location of installation using same designations indicated on Drawings.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller 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 roller 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.

1.8 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. Roller Shades: Full-size units equal to 2 percent of quantity installed for each size, color, and shadeband material indicated, but not fewer than two units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product for Manually Operated Roller Shades: Subject to compliance with requirements, provide MechoShade Systems, Inc.; "Mecho/5" or a comparable product by one of the following:
 - 1. Draper Inc.
 - 2. Nysan Solar Control Systems.

- B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS (122413.A01 - **TYPE 1 AND TYPE 2**)

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
1. Bead Chains: Stainless steel with Shock Absorber System.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - 1) Provide limit stops with Shock Absorber System reducing chain stress, consisting of a ¾" rubber sleeve, 3/8 inch stop beads and washers to prevent shade from being raised or lowered too far.
 - 2) Clutch mechanism: Fabricated from POM thermoplastic with welded 0.354 inch (9 mm) primary steel post with rotational bearing, overrunning design, and positive mechanical engagement of drive mechanism to tube. White or Black color as selected by Architect. Center bead chain placement for right or left hand operation and accommodates side channel with no adjustment of chain location.
 - c. Chain-Retainer Type: Chain tensioner, jamb mounted.
 2. Spring Lift-Assist Mechanisms: When recommended by roller shade manufacturer for proper operation of shade, provide manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.
 - a. Provide for shade bands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criteria are more stringent.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shade bands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shade bands for service.
1. Roller Drive-End Location: Right side of inside face of shade or left side of inside face of shade as determined by Architect.
 2. Direction of Shadeband Roll: Regular, from back of roller.
 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- E. Shadebands:
1. Shadeband Material: Light-filtering fabric.
 - a. Types:
 - 1) Type 1 - Light filtering shades 3% openness: Enclosed in sealed pocket of shadeband material.
 - 2) Type 2 - Light-blocking (blackout) shades: Exposed with endcaps or exposed with endcaps and integral light seal at bottom where it meets the sill of window opening.
 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Color and Finish: As selected by Architect from manufacturer's full range.
- F. Installation Accessories:
1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - a. Shape: L-shaped.
 - b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open.
 2. Exposed Headbox:
 - a. Description: Rectangular, extruded-aluminum enclosure including the following:
 - 1) Front fascia with integral bottom closure.
 - 2) Top and back covers where back of unit is exposed to glazing.
 - 3) Endcaps.
 - 4) Removable bottom closure, only for pocketed shade.
 - b. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than 3 inches, and not more than 8 inches.

3. Endcap Covers: As required by manufacturer, provide to cover exposed endcaps.
4. Side Channels (Type 2 Blackout Only): With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
5. Bottom (Sill) Channel or Angle (Type 2 Blackout Only): With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
6. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Visually transparent, woven non-raveling single-fabric, stain and fade resistant shadecloth.
 1. Basis-of-Design Product for Light Filtering Shadeband (Fabric): Subject to compliance with requirements, provide MechoShade Systems, Inc.; "ThermoVeil" Dense Basket Weave 1300 Series or Dense Linear Weave 1000 Series as determined by Architect, or comparable product from other roller shade manufacturers submitted to and accepted by Architect prior to bidding.
 2. Source: Roller-shade manufacturer.
 3. Type: Woven from extruded vinyl yarn comprised of 21 percent polyester and 79 percent reinforced vinyl.
 4. Thickness: 0.030 inch.
 5. Weight: Manufacturer's standard.
 6. Roll Width: Manufacturer's standard width up to 126 inches.
 7. Orientation on Shadeband: As indicated on Drawings.
 8. Openness Factor: 3 percent.
 9. Color: As selected by Architect from manufacturer's full range.
- C. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide MechoSystems; "Equinox 0100 Series", Room Darkening (PVC Free) Shadecloth with Opaque Acrylic Backing or comparable product from other manufacturers meeting specified requirements.
 2. Type: Acrylic-coated fiberglass.
 3. Thickness: Not less than 0.008 inches.
 4. Weight: 0.94 lbs. per square yard.
 5. Roll Width: manufacturer's standard widths to suit opening.
 6. Orientation on Shadeband: As indicated on Drawings.
 7. Features: Washable and with antistatic treatment.
 8. Color: As selected by Architect from manufacturer's full range.

2.4 ROLLER SHADE FABRICATION

- A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.
- B. Concealed Components: Non-corrodible 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 Outside Jamb: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
 2. Shade Units Installed Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
- D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting headbox, roller, and operating hardware and for hardware position and shade mounting method indicated.

- E. Installation Fasteners: No 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.
- F. Color-Coated Finish: For metal 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.
- G. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.
- H. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

PART 3 EXECUTION

3.1 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.
 - 1. Blocking at roller shade locations shall be confirmed to be 3/4 inch wood blocking or greater prior to installation.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions and located so shade band is not closer than 4 inches to interior face of glass. Allow clearances for window operation hardware.
- B. Roller Shade Locations: Refer to Drawings.

3.3 ADJUSTING, CLEANING AND PROTECTION

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- B. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- D. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 122413

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SECTION 123200 - MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Plastic-laminate-faced wood cabinets of stock design.
 - 1. Base Cabinet (123200.A01).
 - 2. File Drawer (123200.A05).
 - 3. Sink Base (123200.A10).
 - 4. ADA Sink Base (123200.A11).
 - 5. Trash Base Cabinet (123200.A14).
 - 6. Tall Cabinet (123200.A21).
 - 7. Wall Cabinet (123200.A31).
 - 8. Cubicle Wall Cabinet (123200.A32).
 - 9. Microwave Wall Cabinet(123200.A38).
 - 10. Filler (123200.A81).
 - 11. Finished End (123200.A82).
 - 12. End Panel (123200.A83).
 - 13. Coat Hooks (123200.A92).
 - 14. Keyboard Tray (123200.A95).
 - 15. Pencil Drawer (123200.A96).
- B. Related Sections:
 - 1. Section 012300 "Alternates" for those alternates effecting work of this Section.
 - 2. Section 061000 "Rough Carpentry" for wood blocking for anchoring manufactured wood casework.
 - 3. Section 092116 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring casework.
 - 4. Section 096513 "Resilient Base and Accessories" for resilient base applied to manufactured wood casework.
 - 5. Section 123623 "Plastic Laminate Countertops".
 - 6. Section 123666 "Solid Surfacing Countertops".

1.2 DEFINITIONS

- A. Definitions in the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" apply to the work of this Section.
- B. Balanced Construction: Where exposed face of a panel is surfaced with high pressure plastic laminate and the opposite (back) surface shall receive a balanced product equal in thickness to the face of the panel.
 - 1. Note: Color for interior is not required to match color and pattern of exterior face laminate.
- C. Casework: Modular casework of this Section is that which is pre-manufactured to standard dimensions or sizes. Casework fabricated as part of Section 064023 "Interior Architectural Woodwork" is that which is custom fabricated to suit a particular project.
- D. Concealed Portions of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets.
- E. MDF: Medium-density fiberboard.
- F. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive, and faced both front and back with hardwood veneers.
- G. Exposed Portions of Cabinets: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and surfaces visible in open cabinets and behind glass doors.
 - 1. Ends of cabinets installed directly against walls or other cabinets shall not be considered as exposed.

- H. Semi-exposed Portions of Cabinets: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches or more above floor are defined as semi-exposed.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, submit data describing materials, fabrication, hardware accessories, and installation instructions.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Indicate types, sizes and finishes of cabinets and countertops.
 - 2. Indicate types and locations of hardware.
 - 3. Indicate locations and types of service fittings.
 - 4. Show fabrication details; including locations and sizes for cutouts and holes for plumbing fixtures, science equipment and other items installed in casework.
 - 5. Indicate locations of blocking and reinforcements required for installing casework.
 - 6. Include details of utility spaces showing supports for conduits and piping.
 - 7. Show installation details, including field joints and filler panels.
 - 8. Indicate locations of and clearances from adjacent walls, doors, windows, and other building components.
 - 9. As applicable, indicate manufacturer's catalog numbers for casework.
- C. Samples for Initial Selection: For cabinet finishes and for each type of top material indicated.
- D. Samples for Verification: 8-by-10-inch Samples for each type of finish, including top material.
 - 1. Exposed hardware, one unit for each type.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer. Furnish qualification data for Installer, if different from manufacturer.
- B. Keying Schedule: Include schematic keying diagram and index each key set to unique designations that are coordinated with the Contract Documents.
- C. Certifications: Submit documentation verifying use of "No added formaldehyde" and "marine grade plywood" were incorporated into the work of this Section, as acceptable to and when requested by Architect.
- D. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer with not less than seven years of successful experience, under the current company name, in producing manufactured casework similar to that required for this Project.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project. Installer must have completed projects of similar size and scope to this project in the last 5 years.
- C. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project. Installer must have completed 10 (Ten) consecutive year history of installation in projects K-12 public school buildings in the western USA of similar size and scope to this project. Minimum 5000 lineal feet installed in Colorado.
- D. Source Limitations: Obtain manufactured wood casework from single source from single manufacturer.
- E. Quality Standard: Unless otherwise indicated, comply with the AWI's and WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.
 - 1. Grade: Custom.

2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- F. Product Designations: Drawings indicate sizes, configurations, and finish material of manufactured wood casework. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish material, and complying with the Specifications may be considered as noted below. Refer to Section 012500 "Substitution Procedures" and Section 016000 "Product Requirements."
1. Other manufacturers proposing comparable products shall submit the following for Architect's verification:
 - a. One full-size finished base cabinet complete with hardware, doors, and drawers.
 - b. One full-size finished wall cabinet complete with hardware, doors, and adjustable shelves.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver manufactured wood casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install manufactured wood casework 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 occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of construction contiguous with manufactured wood casework by field measurements before fabrication.
 1. Casework manufacturer is responsible for details and dimensions not controlled by job conditions. Show all required field measurements beyond manufacturer's control on shop drawings.
 2. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.8 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements in walls and partitions for support of manufactured wood casework.
- B. Coordinate installation of laboratory casework with installation of fume hoods and other laboratory equipment.
- C. Coordinate layout and installation of work of this Section with electrical and plumbing contractors. Coordinate installation so as not to interfere with plumbing and electrical work associated with casework.
- D. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of manufactured wood casework that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Delamination of components or other failures of glue bond.
 - b. Warping of components.
 - c. Failure of operating hardware.

- d. Deterioration of finishes.
- 2. Warranty Period: Three years from date of Substantial Completion.

PART 2- PRODUCTS

2.1 PLASTIC LAMINATE FACED CASEWORK MANUFACTURERS

- A. Manufacturers for Plastic-Laminate-Faced Manufactured Casework: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis-of-Design Product: Casework as manufactured by Stevens Industries; Stevens Advantage.
 - 2. Other Manufacturers: Manufacturers list below are required to meet requirements set forth in this Section. Manufacturing procedures may need to be modified for compliance and technical data on casework construction must be submitted for verification. Other manufactures include, but are not limited to:
 - a. TMI Systems Design Corporation.
 - b. Case Systems.
 - c. RCS Millwork.
 - d. Precision Craft.

2.2 PLASTIC-LAMINATE-CLAD CASEWORK

- A. Drawings indicate sizes, configurations, and finish material of manufactured wood casework from Stevens Industries. Models selected include, but are not limited to, the following:
 - 1. Base Cabinet (123200.A01):
 - a. #10374 - Top Drawer 6-1/8" plus 3 Equal Drawers Cab. – Base.
 - b. #10441 - 2 Drawer, 2 Door, Center Divider with Adjustable shelf – Base
 - 2. File Drawer (123200.A05).
 - a. #10313 - 2 Drawers and 1 Full Extension File Drawer
 - 3. Sink Base Cabinet (123200.A10).
 - a. #10479 - 6-1/8" False Front, Sink Base
 - b. #10678 – ADA Sink Base – Casework.
 - 4. ADA Sink Base (123200.A11).
 - a. #10506 - ADA Triple Steel Frame Wall Vanity - Wall-to wall installation.
 - 5. Trash Base Cabinet (123200.A14):
 - a. Trash Receptacle Cabinetry - Premanufactured unit fabricated to sizes and configurations indicated. Unit shall be plastic laminate clad with open bottom design to allow easy storage, removal, and use of trash receptacles.
 - 1) #10698 – Upper Trash Opening with attached Toe Kick Base.- RH.
 - 2) #10699 – Upper Trash Opening with attached Toe Kick Base.-LH.
 - 6. Tall Cabinet (123200.A21)
 - a. #25129- Two Door Cabinet with five shelves, one of which is fixed and the other four adjustable.
 - 7. Wall Cabinet (123200.A31).
 - a. #15129 –Two Door Wall Cabinet
 - b. #15120 - One Door RH
 - c. #15211 - Corner Diagonal RH Door with fixed shelves.
 - d. Sizes as indicated on Drawings
 - 8. Mail Cubicle Wall Cabinet (123200.A33).
 - a. Coordinate sizes and compartment quantity with Architect.
 - b. #15251 - Open Compartments, 3 units wide by 3" H min.
 - 9. Microwave Wall Cabinet (123200.A38).
 - a. Open Microwave Wall Cabinet: Premanufactured unit fabricated to sizes indicated. Unit shall be plastic laminate clad to accomodate 1 -2 cu. ft. microwave.
 - 10. Filler (123200.A81).
 - a. #10803.
 - b. #10805.
 - c. #15803.
 - 11. Finished End (123200.A82).
 - 12. End Panel (123200.A83).

- a. #10954.
- 13. Apron (123200.A84).
 - a. Fabricate from 3/4-inch particleboard, plastic-laminate exposed face and balanced backer. Edging shall be 3mm PVC. Fabricate aprons to be demountable.
- 14. Cabinet Locks (123200.A91).
 - a. Drawer and Hinged Door Locks: Cylindrical (cam) type, 6-pin tumbler, with removable core, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
 - b. Provide a minimum of two keys per lock and six master keys.
 - c. Provide locks on all doors and drawers.
 - d. Inactive door shall receive barrel bolt and strike plate.
- 15. Coat Hooks (123200.A92): Cast aluminum with A14, bright nickel finish. Provide double wardrobe hook, similar to Ives #582.
- 16. Grommets (123200.A93): Refer to the Following Sections for grommets to be installed in the work of this section.
 - a. Section 123666 "Solid Surfacing Countertops"

B. Source Limitations: Obtain plastic-laminate-faced cabinets from single manufacturer.

2.3 MATERIALS, GENERAL

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Softwood Plywood: DOC PS 1, with no added formaldehyde (NAUF).
- C. Particleboard: ANSI A208.1, Grade M-2, with no added formaldehyde (NAUF).
- D. MDF: ANSI A208.2, Grade 130, with no added formaldehyde (NAUF).
- E. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
 - 1. Colors: Refer to Material Finish Legend on drawings for basis of design products.
- F. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
- G. Edge Banding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors, drawer fronts and laminate countertops, 1 mm thick elsewhere.
 - 1. 3mm edge banding shall be machine-applied and set with hot-melt glue.
 - 2. Edge banding colors shall match a solid color of adjacent laminate surface, unless noted otherwise, as determined by Architect. Colors shall not be limited to casework manufacturer's standard stocked colors, but will be selected by Architect from any color group offered by Canplast, Rehau and Doellken-Woodtape.
- H. Edgebanding for Thermoset Decorative Panels: Unless otherwise specified, provide PVC or polyester edge banding complying with LMA EDG-1 and matching thermoset decorative panels.
- I. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.4 CABINET MATERIALS

- A. Exposed Cabinet Materials:
 - 1. Plastic Laminate: Grade HGS for horizontal surfaces and VGS for vertical surfaces.
 - 2. Unless otherwise indicated, provide specified edge banding on all exposed edges.
- B. Semiexposed Cabinet Materials:
 - 1. Plastic Laminate: Grade VGS.
 - a. Provide plastic laminate for semi-exposed surfaces unless otherwise indicated.
 - 1) Color for backs of doors and drawers shall match a solid color of that of cabinet box interior, as determined by Architect. Facings shall be balanced as required by AWI construction guidelines for grade level indicated.

2. Unless otherwise indicated, provide specified edge banding on all semi-exposed edges.

C. Concealed Cabinet Materials:

1. Thermoset decorative panels.

2.5 DESIGN, COLOR, AND FINISH

A. Design: Provide manufactured wood casework of the following design:

1. Flush overlay.

B. Thermoset Decorative Panel Colors, Patterns, and Finishes: As selected by Architect from casework manufacturer's full range.

C. Plastic-Laminate Colors, Patterns, and Finishes: As indicated by manufacturer's designations on Drawings.

D. PVC Edgebanding Color: As selected from casework manufacturer's full range, including pre-formulated colors.

E. Solid Surfacing: As noted on drawings. Where not specifically indicated, as selected by Architect from manufacturer's full range.

2.6 CABINET FABRICATION

A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:

1. Assembly method for cabinets shall utilize "European" assembly screws (threaded steel dowel pins), similar to Hafele "Conformat". At manufacturer's option, alternate doweled assembly methods may be used if in accordance with AWI guidelines and requirements for grade level indicated.
2. Cabinet boxes below sinks shall be fabricated from plywood and shall receive white plastic laminate on the interior.
3. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semi-exposed surfaces.
4. Shelves: Thermoset decorative panels; 3/4-inch thick for spans up to 32 inches and 1-inch thick for spans up to 48 inches.
5. Open Shelves: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces for spans up to 32 inches and 1-inch thick for spans up to 48 inches.
6. Backs of Cabinets: 1/2-inch particleboard or 1/4-inch MDF, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semi-exposed surfaces. Backs shall be captured in a 1/2-inch dado and set back 3/4-inch to accommodate 3/4-inch thick nailers.
7. Drawer Fronts: 3/4-inch particleboard, High Pressure Laminate (HPL) faced exposed face and balanced backer.
8. Drawer Sub-fronts, Sides and Backs:
 - a. 1/2-inch single-species solid-wood or veneer-core hardwood (Birch) plywood, with glued dovetail or multiple dowel joints.
 - b. 1/2-inch, high density fiberboard, 55 pcf density minimum. All parts glued and mechanically fastened using thermosetting fasteners.
 - c. 1/2-inch, high density melamine composite panels. All parts glued and mechanically fastened using thermosetting fasteners.
 - d. Fabricate file drawers and lateral file drawers of width and depth necessary to accommodate hanging file rack system.
9. Drawer Bottoms: 1/4-inch thermoset decorative panels glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
10. Doors: 3/4-inch particleboard or MDF, plastic-laminate faced.
11. Removable Backs: Provide backs that can be removed from within cabinets at utility spaces.
12. Cabinets Bases: Bases shall be fabricated separate from cabinets (not integral). Fabricate from 3/4-inch exterior marine grade plywood or preservative-treated 2x4's with marine-grade plywood face. Fabricate in a ladder configuration with plywood fronts and back running continuous for the length of the cabinet. Provide ends, and provide additional runners centered in all cabinets greater than 24 inches wide.

- B. Filler Strips: Provide as needed to close spaces between cabinets and walls, between cabinets and floors, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.
 - 1. Provide top and bottom fillers and corner panels to close gaps and openings.

2.7 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
 - 1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
 - 2. Provide caps on fasteners at cabinet interiors in color to match adjacent cabinet finish color.
- B. Frameless Concealed Hinges (European Type): 120 degrees of opening, self-closing. Provide two hinges for doors less than 48 inches high, and provide three hinges for doors more than 48 inches high.
 - 1. Basis-of-Design: Steven's Advantage 120 degree Concealed Overlay Hinge - Nickel #AS141NP
 - 2. Option: Blum #71T5580 hinges and Blum hinge plate #174H7100E.
- C. Pulls:
 - 1. Solid aluminum or chrome-plated wire pulls, fastened from back with two screws. Provide 2 pulls for drawers more than 24 inches wide.
 - a. Basis of Design: Provide Steven's Advantage Bentwire Collection "Bentwire 128."
 - 1) Length: 128mm
 - 2) Diameter: 10 mm.
 - 3) Color: Grey Chrome SA001GC
[[Optional Colors: Nickel , White, Black, Oil-Rubbed Bronze]]
- D. Door Catches: Zinc-plated, dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high.
- E. Drawer Slides: BHMA A156.9, Type B05091.
 - 1. Heavy Duty (Grade 1HD-100): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides. Provide with manufacturer's standard metal rear brackets as applicable.
 - a. Basis-of-Design: GSlide Corporation/Knape & Vogt Mfg. Co.; #GS4200.
- F. Hanging File Rails: Manufacturer's standard hanging file rail system. Provide integral system at all base cabinet drawers with dimensions that will accommodate hanging files.
 - 1. At 36" wide base file cabinets, provide rails on front and back for standard legal side filing. Provide two (2) removable crossbars per drawer for optional letter/legal front-to-back filing.
- G. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.
- H. Door Chain/Limitor: Provide casework door chain/limitors at cabinet doors that open to an adjacent wall to prevent doors from damaging the walls. Verify locations with Architect.
- I. Fastener Caps: Provide caps on fasteners at cabinet interiors in color to match adjacent cabinet finish color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of manufactured wood casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CASEWORK INSTALLATION

- A. General: Install cabinets to comply with same grade as item to be installed.
- B. Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to masonry or framing, wood blocking, or reinforcements in walls and partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
 - 1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
- D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, or framing, blocking, or reinforcements in walls or partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
 - 1. Fasten through back, near top and bottom, at ends, and not more than 16 inches o.c.
 - 2. Use toggle bolts at hollow masonry.
 - 3. Use expansion anchors at solid masonry.
 - 4. Use No. 10 wafer-head screws sized for 1-inch penetration at wood hanging strips.
 - 5. Use No. 10 wafer-head screws sized for 1-inch penetration into wood blocking.
 - 6. Use No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish at metal-framed partitions.
- E. Fasten cabinets to adjacent cabinets and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- G. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF SHELVING

- A. Securely fasten shelf standards to masonry, partition framing, wood blocking, or reinforcements in partitions.
 - 1. Fasten shelf standards at ends and not more than 12 inches () o.c.
 - 2. Use toggle bolts at hollow masonry.
 - 3. Use expansion anchors at solid masonry.
 - 4. Use self-tapping sheet metal screws in metal framing or metal backing at metal-framed partitions. Do not use wall anchors in gypsum board.
 - 5. Use wood screws sized for 1-inch () penetration into wood blocking.
 - 6. Use toggle bolts at plaster on metal lath.
- B. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Space standards not more than 36 inches o.c.
- C. Install shelving level and straight, closely fitted to other work where indicated.

3.4 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION 123200

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SECTION 123666 - SOLID SURFACING COUNTERTOPS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid surface material countertops (123666.A01).
 - 2. Solid surface material transaction counters (123666.A02).
 - 3. Solid surface material backsplashes and end splashes (123666.A03).
 - 4. Solid surface material sills (123666.A05).
 - 5. Solid surface material apron fronts (123666.A07).
 - 6. Grommets (123666.A11)
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
 - 2. Section 012200 "Unit Prices" for unit prices affecting work of this Section.
 - 3. Section 061000 "Rough Carpentry" for blocking as required.
 - 4. Section 064023 "Interior Architectural Woodwork" for custom casework.
 - 5. Section 079200 "Joint Sealants" for countertop sealants.
 - 6. Section 123200 "Manufactured Wood Casework" for premanufactured casework.
 - 7. Division 22 "Plumbing" for sinks and plumbing fittings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, submit data describing materials, fabrication, hardware accessories, and installation instructions.
- B. Shop Drawings: Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures, as applicable.
 - 1. Show locations and details of joints.
 - 2. Show direction of directional pattern, if any.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
 - 1. Countertop material, 6 inches square.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop with not less than seven years of experience, under the current company name, 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.

- B. Installer Qualifications: Fabricator of products or manufacturer's authorized representative who is trained and approved for installation of units required for this Project. Installer must have completed 7 projects of similar size and scope to this project in the last 5 years.
- C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
 - 1. Build mockup of typical **countertop ,transaction counter, sill, and wall cap** as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect solid surfacing during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver solid surfacing, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate solid surfacing which have been completed in installation areas

1.7 FIELD CONDITIONS

- A. Field Measurements: Where work of this Section 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. Verify dimensions by field measurements before fabrication is complete.
 - 1. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.8 COORDINATION

- A. Solid surfacing subcontractor shall coordinate with the mechanical & electrical contractors to assure proper working clearances, receptacle/fixture locations, and all connection/fittings necessary to function properly.
- B. Coordinate locations of utilities that will penetrate countertops[,transaction counters] or backsplashes.
- C. Coordinate layout and installation of framing and reinforcements in walls and partitions for support of work of this Section.

PART 2 PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. Type: Provide Standard type unless Special Purpose type is indicated.
 - 2. Colors and Patterns: As indicated by manufacturer's designations on Material Finish Legend.
- B. Particleboard: ANSI A208.1, Grade M-2, except at countertops with sinks, provide Grade M-2-Exterior Glue.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- D. Basis-of-Design Product: Subject to compliance with requirements, provide LX Hausys Himacs Solid Surface or comparable product from an available manufacturer submitted to and accepted by Architect prior to bidding:

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Premium.
- B. Configuration:
1. Front: Straight, slightly eased at top.
 2. Backsplash: Straight, slightly eased at corner.
 3. End Splash: Matching backsplash, as applicable.
 4. Sills: Straight, slightly eased at top.
- C. Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 1/2-inch- thick, solid surface material.
- E. Fabricate in one piece, unless otherwise indicated. Comply with solid surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
- F. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
1. Fabricate with loose backsplashes for field assembly.
 2. Install integral sink bowls in countertops in the shop. Ease edge or chamfer edge at sink to countertop connection.
- G. Joints: Fabricate countertops (up to 10 feet in length) without joints.
- H. Joints: Fabricate countertops (greater than 10 feet in length) in sections for joining in field.
1. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
 2. Splined Joints: Where narrow strips of solid surface material between joints occur to form large openings, provide splined joints. Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit.
- I. Cutouts and Holes:
1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop, to best extent possible, using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
 - b. Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch into fixture opening.
 - c. Provide 3/4-inch full bullnose edges projecting 3/8 inch into fixture opening.
 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
 4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.3 ACCESSORIES

- A. Wire-Management Grommets (123666.A11): Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
1. Cable Passage through Grommet for Countertops: 2-1/2-inch OD, molded-plastic grommet with flip top matching plastic caps with slot for wire passage. Color as selected by Architect.
 - a. Basis-of-Design Product: Doug Mockett and Company, Inc.; Model EDP3.

2.4 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

- C. Fasteners: Provide non-corrosive fasteners as required for complete installation of components and assemblies. Type and size shall be as required for conditions, materials and superimposed loads involved.
- D. Accessories: Comply with manufacturer's recommendations for hardware, non-corrosive fasteners, adhesives, sealers, fabrication and finishing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Install metal splines in kerfs in countertop edges at joints as specified. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
 - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- F. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 - 1. Seal edges of cutouts in particleboard and plywood subtops by saturating with varnish.
- H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123666