

# PROJECT MANUAL

## EMMANUEL LUTHERAN CHURCH NORTH ENTRY UPGRADES

4865 WILMINGTON PIKE  
KETTERING, OH 45429

January 3, 2020

prepared by

**THE ARCHITECTURAL GROUP, INC.**  
135 N. MAIN ST.  
DAYTON, OH 45402-1730

TAG Project Commission No.: 1855



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Sealed bids will be accepted by Emmanuel Evangelical Lutheran Church, until **Tuesday, February 25, 2020 at 2:00 p.m.** at the **The Architectural Group, Inc. 135 N. Main St., Dayton, OH 45402**, for all work necessary for the **NEW ENTRY EMMANUEL LUTHERAN CHURCH**.

The Base Bid Estimate on this project is **\$ 330,272.00**

**Bid is by invitation only.**

Copies of the plans, specifications and bidding documents may be obtained from the Architect.

The bid shall include the costs to perform all the work shown on the drawings and described in the project specifications. Separate bids for portions of the project not listed on the BID form will NOT be accepted.

Bids shall be made in duplicate and such bids shall be placed in a sealed envelope addressed to Owner and clearly marked as **NEW ENTRY EMMANUEL LUTHERAN CHURCH**.

Emailed bids will be accepted if sent to Maria Schertler, AIA at [schertlerm@taguit.com](mailto:schertlerm@taguit.com).

The Owner reserves the right to reject any or all bids and to waive any irregularities in a bid, or to accept that bid which, in the judgment of proper officials, is to the best interest.

The bidders are encouraged to attend a **pre-bid meeting** to be held on **Thursday January 16, 2020 at 2:00 p.m. and Tuesday February 4, 2020 at 10:00 a.m.** at **4865 Wilmington Pike, Kettering, OH 45404**.

**END OF SECTION**

**SECTION 00 2113  
INSTRUCTIONS TO BIDDERS**

**PART 1 SUMMARY**

**1.01 DOCUMENT INCLUDES**

- A. Invitation
  - 1. Bid Submission
  - 2. Intent
  - 3. Contract Time
- B. Bid Documents and Contract Documents
  - 1. Definitions
  - 2. Contract Documents Identification
  - 3. Availability
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- G. Offer Acceptance/Rejection
  - 1. Duration of Offer
  - 2. Acceptance of Offer

**1.02 RELATED DOCUMENTS**

- A. Document 00 1113 – Invitation to Bidders.
- B. Document 00 3100 - Available Project Information.
- C. Document 00 4100 - Bid Form.

**A. INVITATION**

**2.01 BID SUBMISSION**

**Submit Bids, in a sealed envelope bearing on the outside the name of the Bidder, the Bidder's address, and the name of the Project for which the Bid is submitted. If forwarded by mail, the sealed envelope containing the Bid shall be enclosed in another envelope addressed to the Owner specified in the advertisement for Bid. Bids submitted by fax will not be accepted.**

- A. Bids signed and under seal, executed, and dated will be received at the office of **The Architectural Group, Inc. at 135 N. Main St., Dayton, OH 45402** before **2:00 p.m.** on **Tuesday, February 25, 2020.**
- B. Bids submitted after the above time may be returned to the bidder unopened.
- C. Bids will be opened publicly immediately after the time for receipt of bids.
- D. Emailed bids will be accepted if received no more than 3 hours PRIOR to date time bids are due to Maria Schertler, AIA at [schertlerm@taguit.com](mailto:schertlerm@taguit.com).

## 2.02 INTENT

- A. The intent of this Bid request is to obtain an offer to perform work to complete **NEW ENTRY EMMANUEL LUTHERAN CHURCH** for a Stipulated Sum contract, in accordance with the Contract Documents.

## 2.03 CONTRACT TIME

- A. Identify Contract Time or Completion Date in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.
- B. Owner requires that under the scope of this contract the work be completed as quickly as possible and consideration will be given to time of completion when reviewing the submitted bids.
- C. Anticipated construction start date is to be April 13, 2020.

## B. BID DOCUMENTS AND CONTRACT DOCUMENTS

### 3.01 DEFINITIONS

- A. Contract Documents: Defined in Paragraph 3.02 including issued Addenda.
- B. Bid, Offer, or Bidding: Act of submitting an offer under seal.
- C. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

### 3.02 CONTRACT DOCUMENTS IDENTIFICATION

- A. The Contract Documents are identified as **Comm #1855**, as prepared by **The Architectural Group, Inc.** who is located at **135 N. Main St., Dayton OH 45402**, and with contents as identified in the Table of Contents.
- B. The Contract Documents are identified as **NEW ENTRY EMMANUEL LUTHERAN CHURCH**.

### 3.03 AVAILABILITY

- A. Bid Documents for a Stipulated Sum contract may be obtained from **The Architectural Group, Inc.**

### 3.04 EXAMINATION

- A. Bid Documents may be viewed at the office of Architect which is located at 135 N. Main St., Dayton, OH 45402.
- B. Bid Documents are on display at the offices of the following construction plan rooms:

- 1. ARC

- 434 E. Third St.  
Dayton, Ohio 45402  
937-277-7930

- 2. Dayton Builders Exchange

- 2077 Embury Park Road  
Dayton, Ohio 45414  
937-278-5723  
info@bxohio.com

- \*Documents posted here will be accessible in Dayton, Cleveland, Cincinnati, and Toledo

- C. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.
- D. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

### 3.05 INQUIRIES/ADDENDA

- A. Clarifications requested by bidders must be in writing to the Architect, before 3:00 p.m. local standard time on **February 17, 2020**. Requests for information and clarification or substitutions must be submitted in writing. Reply will be in the form of an Addendum. Provide to all plan holders of record.

- B. Direct questions to Maria Schertler via email: schertlerm@taguit.com. Questions received after **February 17, 2020** will not be answered.
- C. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.
- D. Verbal answers are not binding on any party.

### **3.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS**

- A. When a request to substitute a product is made, Architect may approve the substitution and will incorporate into an addendum.
- B. In submission of substitutions to products specified, bidders shall include in their bid all changes required in the Work and changes to Contract Time and Contract Sum to accommodate such substitutions. A later claim by the bidder for an addition to the Contract Time or Contract Sum because of changes in work necessitated by use of substitutions shall not be considered.
- C. The submission shall provide sufficient information to determine acceptability of such products.
- D. Provide complete information on required revisions to other work to accommodate each proposed substitution.
- E. Provide products as specified unless substitutions are submitted in this manner and accepted.

### **SITE ASSESSMENT**

#### **4.01 SITE EXAMINATION**

- A. Examine the project site before submitting a bid.
- B. Bidders are welcome to visit the exterior areas of the site at their convenience.
- C. The currently occupied premises at the project site are open for examination for bidders by appointment only which shall be scheduled through:
  - 1. The Architect's Representative: Maria Schertler, AIA, schertlerm@taguit.com, 937-223-2500.
- D. Site may only be accessed between the hours of 8:00 am and 4:00 pm; Monday thru Friday.

#### **4.02 PREBID CONFERENCE**

- A. Bidders conferences have been scheduled for **Thursday January 16, 2020 at 2:00 p.m.** and **Tuesday February 4, 2020 at 10:00 a.m.** at 4865 Wilmington Pike, Kettering, OH 45429.
- B. All general contract bidders, sub-contract bidders and suppliers are invited.
- C. Representatives of the Owner's Architect will be in attendance.
- D. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document holder of record.

### **D. BID SUBMISSION**

#### **6.01 SUBMISSION PROCEDURE**

- A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- B. Submit two (2) copies of the executed offer on the Bid Forms provided, signed and sealed with the required Supplements Document and security in a closed opaque envelope, clearly identified with bidder's name, project name and Owner's name on the outside.
- C. Bids will be opened privately. An abstract summary of submitted bids will be made available to all bidders following bid opening.
- D. Owner reserves the right to reject a proposed subcontractor for reasonable cause.

## **6.02 BID INELIGIBILITY**

- A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.
- B. Bid Forms, Appendices, and enclosures that are improperly prepared may, at the discretion of Owner, be declared unacceptable.
- C. Failure to provide security deposit, bonding or insurance requirements may, at the discretion of Owner, be waived.

## **E. BID ENCLOSURES/REQUIREMENTS**

### **7.01 BID FORM REQUIREMENTS**

- A. Complete all requested information in the Bid Form and Appendices.

### **7.02 FEES FOR CHANGES IN THE WORK**

- A. Include the fees for overhead and profit on own Work and Work by subcontractors, identified in Document A101 General.
- B. Include in the Bid Form, the overhead and profit fees on own Work and Work by subcontractors, applicable for Changes in the Work, whether additions to or deductions from the Work on which the Bid Amount is based.

### **7.04 BID FORM SIGNATURE**

- A. The Bid Form shall be signed by the bidder, as follows:
  - 1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign.
  - 2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature.
  - 3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature.
  - 4. Joint Venture: Each party of the joint venture shall execute the Bid Form in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

### **7.05 SELECTION AND AWARD OF ALTERNATES**

- A. Indicate variation of bid price for Alternates listed on the Bid Form. Unless otherwise indicated, indicate as a difference in bid price by adding to or deducting from the base bid price.
- B. Bids will be evaluated on the base bid price. The Owner may select based on the best and most responsible bidder. After determination of a successful bidder, consideration will be given to Alternates and bid price adjustments.

## **F. OFFER ACCEPTANCE/REJECTION**

### **8.01 DURATION OF OFFER**

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of sixty (60) calendar days after the bid closing date.

### **8.02 ACCEPTANCE OF OFFER**

- A. Owner reserves the right to accept or reject any or all offers.
- B. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written Bid Acceptance.

**END OF SECTION**



**SECTION 00 3100**  
**AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 EXISTING CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:
- B. Site and Utility Survey: Entitled **EXHIBIT A: EXISTING SITE PLAN**, dated **07/15/19**. (1 Sheet)
- C. Record Drawings: Entitled **A SANCTUARY, ADDITION for EMMANUEL EVANGELICAL LUTHERAN CHURCH**, dated **7/5/78**. Carl H. Fasse, AIA Architect (21 Sheets)
- D. Geotechnical Report: **EXHIBIT B: Soil Study for Proposed Entrance Addition and Drive Through Canopy, Wilmington Pike, Kettering, Ohio. Dated December 19, 2019.**
- E. **EXHIBIT C: Proposed Owner/Contractor Agreement A101-2017.** (Attached document)
- F. **EXHIBIT D: General Conditions AIA A201-2017.** (Attached document)

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 OBTAINMENT OF PERMITS**

- A. Owner will obtain the following permits, at no cost to the Contractor:
  - 1. Zoning Permit.
- B. Contractor will obtain the following permits, at no cost to the Owner:
  - 1. General Building Permit.
- C. Building Permit Procedures: When required to obtain this permit:
  - 1. Complete and file permit application(s) with appropriate agency.
  - 2. Pay required fees.
  - 3. Advise Architect if submission of modified documents are necessary to have the authorities having jurisdiction complete the plan review and approval process. Submit modified documents expeditiously.
  - 4. Do not commence execution of any item of work for which a permit has not been obtained.

**END OF SECTION**

**SECTION 00 4100  
BID FORM**

**THE PROJECT AND THE PARTIES**

**1.01 TO:**

- A. Owner  
EMMANUEL EVANGELICAL LUTHERAN CHURCH  
4865 WILMINGTON PIKE  
KETTERING, OH 45429

**1.02 FOR:**

- A. Project: New Entry

**1.03 DATE: \_\_\_\_\_ (BIDDER TO ENTER DATE)**

**1.04 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)**

- A. Bidder's Full Name \_\_\_\_\_  
1. Address \_\_\_\_\_  
2. City, State, Zip \_\_\_\_\_

**1.05 BASE BID**

- A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by The Architectural Group, Inc. for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:
- B. \_\_\_\_\_ dollars  
(\$ \_\_\_\_\_), in lawful money of the United States of America.
- C. The Owner is a 503(c)3 entity and is exempt from State of Ohio sales tax.

**1.06 ALTERNATES**

The following Alternate costs may be added or deducted from the Base Bid as indicated below. Alternates shall be as described in Section 01 2300.

B. ALTERNATE #1 – Additional FOYER CARPET

Add  Deduct \$ \_\_\_\_\_

C. ALTERNATE #2 – Delete PAINTING

Add  Deduct \$ \_\_\_\_\_

D. ALTERNATE #3 – Partial ROOF REPLACEMENT

Add  Deduct \$ \_\_\_\_\_

F. ALTERNATE #4 – NURSERY WINDOW REPLACEMENT

Add  Deduct \$ \_\_\_\_\_

F. ALTERNATE #5 – DELETE CUPOLA

Add  Deduct \$ \_\_\_\_\_

**1.07 SUBCONTRACTORS**

A. Indicate, where appropriate, sub-contractor primarily responsible for each Division of Work.

B. Sub-Contractor

1. General Requirements (Div 1)	_____	\$ _____
2. Concrete (Div 3)	_____	\$ _____
3. Masonry (Div 4)	_____	\$ _____
4. Metals (Div 5)	_____	\$ _____
5. Rough Carpentry (Div 6)	_____	\$ _____
6. Roofing (Div 7)	_____	\$ _____
7. Storefronts and Glazing (Div 8)	_____	\$ _____
8. Automatic Door Operators (Div 8)	_____	\$ _____
9. Finishes (Div 9)	_____	\$ _____
10. Specialties (Div 10)	_____	\$ _____
11. HVAC (Div 15)	_____	\$ _____
12. Electrical (Div 16)	_____	\$ _____
13. Earthwork (Div 31)	_____	\$ _____
14. Paving (Div 32)	_____	\$ _____
<b>BASE BID TOTAL:</b>		\$ _____

**1.08 VOLUNTARY ALTERNATES**

A. Bidder may at its options offer voluntary Alternates as exceptions to the plans and specifications as Adds or Deducts to the base bid.

B. Attach additional descriptive information as needed.

C. The Owner may accept or reject Voluntary Alternates at its own discretion.

D. ALTERNATE #1 \_\_\_\_\_  
 Add  Deduct \$ \_\_\_\_\_

E. ALTERNATE #2 \_\_\_\_\_  
 Add  Deduct \$ \_\_\_\_\_

F. ALTERNATE #3 \_\_\_\_\_  
 Add  Deduct \$ \_\_\_\_\_

**1.09 ACCEPTANCE**

A. This offer shall be open to acceptance and is irrevocable for thirty days from the bid closing date.

B. If this bid is accepted by Owner within the time period stated above, we will:

1. Execute the Agreement within seven days of receipt of Notice of Award.

**1.10 CONTRACT TIME**

A. If this Bid is accepted, we will:

B. Commence work within \_\_\_\_\_ days after written Notice to Proceed of this Bid.

C. Complete the Work within \_\_\_\_\_ calendar days after the Notice to Proceed.

**1.11 CHANGES TO THE WORK**

- A. When Architect establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, our percentage fee will be:
  - 1. \_\_\_\_\_ percent overhead and profit on the net cost of our own Work;
  - 2. \_\_\_\_\_ percent on the cost of work done by any Subcontractor.
  
- B. On work deleted from the Contract, our credit to Owner shall be Architect-approved net cost plus \_\_\_\_\_ of the overhead and profit percentage noted above.

**1.12 ADDENDA**

- A. The following Addenda have been received. The modifications to the Bid Documents noted there in have been considered and all costs are included in the Bid Sum.
  - 1. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.
  - 2. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.

**1.13 BID FORM SIGNATURE(S)**

Submitted by: \_\_\_\_\_ Company Name

Signature: \_\_\_\_\_

Written Name \_\_\_\_\_ Title: \_\_\_\_\_

Type of Entity:     Sole Proprietor         Corporation         Other (attach description)

STATE OF OHIO        )

COUNTY OF \_\_\_\_\_ )

The foregoing Architect's Certificate was subscribed and sworn to before me on \_\_\_\_\_ by \_\_\_\_\_

\_\_\_\_\_  
Notary Public

My Commission expires: \_\_\_\_\_

**1.15 IF THE BID IS A JOINT VENTURE OR PARTNERSHIP, ADD ADDITIONAL FORMS OF EXECUTION FOR EACH MEMBER OF THE JOINT VENTURE IN THE APPROPRIATE FORM OR FORMS AS ABOVE.**

**END OF BID FORM**

## SECTION 00 8110

### SUPPLEMENTARY CONDITIONS

The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A201, 2017, which may or may not be bound herein. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

The PROJECT:

**NEW ENTRY EMMANUEL LUTHERAN CHURCH  
4865 Wilmington Pike  
Kettering, OH 45404**

The OWNER:

**Emmanuel Evangelical Lutheran Church  
4865 Wilmington Pike  
Kettering, OH 45404**

The ARCHITECT:

**The Architectural Group, Inc.  
135 North Main St.  
Dayton, OH 45402**

### ARTICLE 1 GENERAL PROVISIONS

#### 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1.2.4 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

1. The Agreement.
2. Addenda, with those of later date having precedence over those of earlier date.
3. The Supplementary Conditions.
4. The General Conditions of the Contract for Construction.
5. Drawings
6. Specifications.

In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

1.2.5 The general character and scope of the Work are shown by the Drawings. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all similar parts of the Work.

1.2.6 Figured dimensions shall be followed in preference to scaled measurements. Dimensions on Drawings are subject to field verification to suit adjacent elements.

1.2.7 Where a number is listed in the specifications (as for gauges, weights, temperatures, amount of time, etc.) the number shall be interpreted at that or better. Variations must be requested in writing by the Contractor and must be approved in writing by the Architect.

- 1.2.8 Should the Contract Documents disagree as to quality or quantity of work required, the better quality or greater quantity shall be provided unless instructions are otherwise given by the Architect in writing.
- 1.2.9 Division 1 Specifications: Requirements of Division 1 Sections shall apply to all Sections of Division 2 through Division 26, inclusive of the Specifications.

## **ARTICLE 2 OWNER**

### **2.1 GENERAL**

*Add the following subparagraph 2.1.3 and clause 2.1.3.1:*

- 2.1.3 In consideration of the Owner's proactive role in the Design and Construction Administration phases, and within the legal limits of the Contract Documents, the following shall be required:
- 2.1.3.1 All Design and Construction Administration instructions and decisions pertaining to the Project shall be reviewed and approved by the Owner in a form acceptable to the Owner, the Architect, and the Contractor prior to performing the affected work.

## **ARTICLE 3 CONTRACTOR**

### **3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR**

*Add the following subparagraph:*

- 3.2.5 The Contractor shall not avail himself of any manifestly unintentional error or omission should such exist, and shall promptly bring such to the attention of the Architect and the Owner. The Contractor shall give written notice to the Architect of any materials or apparatus which he believes inadequate or unsuitable, and notice of any necessary work omitted.

### **3.6 TAXES:**

*Revise the following subparagraphs 3.6.2 and 3.6.3:*

- 3.6.1 The Owner shall be responsible for all real estate taxes.
- 3.6.2 In addition to those taxes outlined in Article 3 of the General Conditions, the Contractor shall pay all social security unemployment withholding, and all other taxes required by Federal, State, and Local Laws.

### **3.7 PERMITS, FEES AND NOTICES AND COMPLIANCE WITH LAWS:**

*Add the following clause to 3.7.1:*

- 3.7.1.1 Each contractor, i.e., General, Plumbing, Heating and Electrical Contractors shall figure in his bid the amount of his part of permit costs and turn over this amount to the General Contractor before permit is obtained. All other permits for the execution of the work included in separate contracts shall be secured and paid for by the Contractor whose Work is involved.

### **3.10 CONTRACTOR'S CONSTRUCTION AND SUBMITTAL SCHEDULE:**

*Add the following clause to 3.10.1:*

- 3.10.1 The Contractor shall keep progress schedule up to date and revise as required on a weekly basis; forward to the Architect with each Pay Application, a summary report of the progress of various parts of the Work under the contract, stating the existing status, rate of progress, estimated time of completion and cause of delay, if any, advising of action being taken to return

project to its original schedule, and show such action on the Progress Schedule, and reissue to parties concerned.

### 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

*Add the following subparagraph 3.12.11:*

3.12.11 Approved Drawings: The Contractor is responsible for obtaining and distributing required prints of shop drawings to his subcontractors and material suppliers after as well as before final review. Prints of approved shop drawings may be reproduced which carry the Architect's appropriate stamp. No unstamped drawing may be used for the fabrication or installation of any items.

*Add paragraph 3.19 and subparagraph 3.19.1:*

### 3.19 CERTIFICATE OF OCCUPANCY:

3.19.1 General Contractor shall obtain a Certificate of Occupancy if and as required by governing City or State authorities and give to the Owner prior to final acceptance of project work. Certificate shall be turned over to the Owner with a copy forwarded to the Architect.

## **ARTICLE 7 CHANGES IN THE WORK**

*Add the following paragraph 7.5 and related subparagraphs:*

### 7.5 DEFINITIONS

7.5.1 A BULLETIN is a clarification of the Drawings or Specifications that is issued by the Owner and/or Architect/Engineer after the Drawings and Specifications have been "Released for Construction." A Bulletin may serve to clarify Contractor understanding of Work currently contracted and it may direct the Contractor to proceed with pricing a possible change to the Work and the following circumstances:

.1 A Bulletin is issued by the Owner and/or the Architect/Engineer;

7.5.2 Each completed Bulletin shall include a detailed cost breakdown, with back-up documentation prepared in accordance with Subparagraph hereof, showing the adjustment to the Contract Sum and the adjustment in the Contract Time and the Owner's Project Schedule, if any, such change would entail.

7.6.3 Completed Proposals, if any, must be returned to the Owner within seven (7) days after receipt of a Bulletin. In the event that the Contractor fails to submit a completed Proposal (or if the Proposal is not fully complete) within the applicable period, as set forth herein, or is unable to identify specific, permissible costs within said period, it shall conclusively be deemed that no increase in the Contract Sum or Contract Time is required.

7.6.4 The Owner shall have no obligation to approve completed Bulletins / Proposals.

*Add the following paragraph 7.7 and related subparagraphs 7.6.1 through 7.6.8:*

### 7.6 PRICING FOR CHANGED WORK

7.6.1 The Owner shall, at all times, have the right to order changes in the Work to be performed on the basis of a Unit Price.

7.6.2 Credits for deductions from the Work shall be determined on the same basis as charges for additions to the Work except that a reasonable amount shall be deducted for overhead and profit in the case of deletions from the Work and the affected Subcontractor shall be allowed

any restocking or material and equipment cancellation charges payable to suppliers and vendors for the purpose of computing the credit resulting from deductions from the Work.

- 7.6.3 Should the Owner elect to have changed Work performed on a Unit Price Basis, it will so indicate in the Construction Change Directive or Change Order and the Contractor will, with reasonable promptness but any in event within the time periods set forth in Subparagraphs hereof, transmit a Unit

Price Proposal detailing the proposed adjustment to the Contract Sum (and the various components thereof) and as follows:

- .1 The Contractor's Unit Price Proposal shall be based solely upon the affected Subcontractors' estimated net cost for labor (including union fringe benefits, insurance, employment insurance, Social Security and taxes paid on labor) and materials and excluding increased bond premiums plus the percentages for overhead and profit as hereinafter set forth.
- .2 The Contractor's Unit Price Proposal shall be itemized and segregated by labor and material for the various components of the changed Work and no aggregate figures for labor and material will be acceptable.
- .3 The Contractor shall furnish, with the Contractor's Unit Price Proposal, supporting data consisting of Subcontractor, Sub-Subcontractor, and vendor executed proposals. The Subcontractor or Sub-Subcontractor actually performing the changed Work shall be permitted to include in the estimate not more than ten percent (10%) for overhead and profit; Subcontractors of a higher tier shall be permitted to include in the estimate a handling charge of not more than five percent (5%). The Subcontractors may include in their labor proposal only those workers directly involved in the changed Work. All other supervision is included in the percentages for overhead and profit allowed the Subcontractors, unless (i) additional foreman are required in connection with the changed Work who were not otherwise on the site; or (ii) the total Contract Time is extended as a result of the changed Work, in which event an equitable amount shall be allowed for supervision during the extended period. Subcontractor's material costs will include invoiced costs, transportation, and applicable sales or use taxes.
- .4 Use of small tools is included in the overhead and profit.
- .5 Equipment rental may be included only if the equipment will be required on the Site for a longer duration solely because of the changed Work.
- .6 The quantities must be itemized in relation to each specific item in the Contract Documents. The Unit Prices will also be applied to net increases in quantities of the same item. The Unit Prices will also be applied to net decreases in quantities of the same item.
- .7 Overhead and profit, as outlined above, includes all other costs whatsoever beyond those enumerated.
- .8 If any of the changed Work included in the Unit Price Proposal is covered by Contract Unit Prices, the Owner may elect to use these Unit Prices within the Unit Price Proposal. No overhead and profit may be applied to these Unit Prices.

- 7.6.4 Unless and until the Owner shall approve the Contractor's Unit Price Proposal and then issue a signed Construction Change Directive and/or Change Order, the Contractor shall not proceed with such change in the Work. In the event the Contractor proceeds with a Change in the Work which may result in an increase in the Contract Sum or Contract Time, the Contractor does so at his sole risk and at no cost or expense to the Owner.



- 7.6.5 The General Conditions Cost shall not be subject to change in connection with Change Orders unless (i) the total Contract Time is extended as a result of a Change Order; or (ii) additional on-site resources of the Contractor or other reimbursable General Condition Items are required during the original Contract Time as a result of a Change Order. Any increase in the General Conditions Cost will be based on the additional resources of the Contractor and not on the value of the changed Work.
- 7.6.7 If the Owner and the Contractor agree that a Change Order results in one or both of the situations described above, the General Conditions Cost will be increased by a mutually acceptable amount which will be based on the additional resources of the Contractor and not only the value of the changed Work.
- 7.6.8 As part of its Final Payment, the Contractor shall include the actual invoiced premiums for adjustments to payment and performance bonds as a result of approved Change Orders.

## **ARTICLE 9 PAYMENTS AND COMPLETION**

### **9.3 APPLICATIONS FOR PAYMENT:**

#### *9.3.1 Delete subparagraph and substitute:*

- 9.3.1 The Contractor shall submit to the Architect an application for each payment in a form setting forth the original amount of the contract, the net amount of charges therein, the amounts previously paid on account of the unpaid balance thereof, and the total amount of the payment requested by the Contractor. The form of application shall be the American Institute of Architects Documents G702 and the Continuation Sheet G703.

*Add the following clauses to 9.3.1:*

- 9.3.1.3 The application and general accounting of the project shall be submitted in a format acceptable to the Owner. The application for payment shall be accompanied by a sworn statement from the Contractor certifying that the payment being requested will be applied to satisfy the Contractor's specified obligations to Subcontractors and Material Suppliers if such obligations have not been satisfied previously. The sworn statement shall also certify that all labor of the Contractor is and has been paid for in full to date of invoice. The Contractor shall, within fifteen (15) days from the date of the Owner's remittance, submit to the Architect's office, Waivers of Lien signed by each Subcontractor and Material Supplier wherein payments are \$200.00 or more acknowledging payment to the amounts set forth as due and payable on the sworn statement which accompanied the Contractor's invoice. Subsequent invoices under the Contract are not payable until all required Waivers of Lien have been received covering previously paid invoices.
- 9.3.1.4 Without limiting the foregoing, Contractor shall furnish Owner such waivers, receipts, certificates and affidavits as may be required by local, prevailing mechanics' Lien statutes in order to ensure lien free completion of the Work.
- 9.3.1.5 Partial payments will be based on amounts expended for labor performed, material delivered, and other costs incurred under the contract, in an amount in each case equal to (10% Retainage) ninety percent (90%) of the total amount so certified less the aggregate of the previous payments.
- 9.3.1.6 Notwithstanding the foregoing provisions, at any time after fifty percent (50%)>= of the Work of a Subcontractor has been completed, if the progress performance of the Work is satisfactory to the Architect and the Owner, the Owner, at the request of the Contractor, with the consent of the Surety Company, if any will reduce the increment retained in connection with any subsequent progress payments or may make any subsequent progress payments in full.

*Add the following clause to 9.3.2:*

9.3.2.1 Risk of loss during warehousing and transportation of all materials stored away from the Property, whether or not progress payments have been made for the same, shall nevertheless remain upon the Contractor.

#### 9.5 DECISIONS TO WITHHOLD CERTIFICATION

*Add to paragraph 9.5.1:*

- .8 Erroneous estimates by the Contractor of the value of the work performed.
- .9 Unauthorized deviations by the Contractor from the Contract Documents.

#### 9.6 PROGRESS PAYMENTS

*Add to subparagraph 9.6.1:*

"After receipt of the Certificate for Payment from the Architect, the Owner shall make payment within 30 calendar days.

*Add the following clause to 9.6.1:*

##### 9.6.1.1 Owner's Requirements

The Owner shall make payment in the manner and within the time provided in the Contract Documents provided the Contractor submits to the Owner:

- .1 all data establishing payment or satisfaction of obligations, such as receipts, releases, and partial waivers of liens, claims, security interests or encumbrances covering the amount of the Application for Payment and arising out of the Contract, to the extent and in such form as may be designated by the Contract Documents.
- .2 any reasonable requirement of any financing agency with respect to disbursement of loan proceeds.
- .3 any reasonable request of the title insurance company with respect to date-down of title insurance policies.

#### 9.10 FINAL COMPLETION AND FINAL PAYMENT

*Add the following subparagraphs 9.10.6 and 9.10.7:*

9.10.6 The Date of Final Completion of the Work is the Date on which the Work shall be fully, completely, and finally completed in accordance with the Contract Documents and:

- .1 A final, unconditional Certificate of Occupancy has been issued (unless the same cannot be issued because of work and/or conditions beyond the scope of this Contract);
- .2 Contractor has completed all Punch List items to the satisfaction of the Owner, including providing Owner with the results of any and all tests that may be required;
- .3 Contractor has marked all utilities and tagged all electrical switches and valves to designate the purpose of such electrical switches and valves and, to the extent applicable, marked the base of structures where parking lot lighting and other utility leads enter the structure; and
- .4 Contractor has delivered to the Owner:
  - a. All maintenance and operating manuals;
  - b. Marked sets of working drawings, and Plans and Specifications reflecting "record" conditions;
  - c. Reproducible drawings (to be supplied by the Architect/Engineer) upon which the Contractor shall have transferred all changes in the location of any concealed utilities, mechanical or electrical systems and components;
  - d. Any special guarantees or warranties required by the Contract Documents;
  - e. An assignment and/or transfer of all guarantees and warranties from Subcontractors, vendors, suppliers, and manufacturers;
  - f. A list of the names, addresses and phone numbers of all Subcontractors and other persons providing guarantees or warranties;

- g. The subcontractor close-out logs.
- h. All required sworn statements and lien waivers;
- i. All attic-stock is supplied to the Owner;
- j. Final submittals;
- k. Any required sales tax information;
- l. Reconciliation of temporary utility costs; and
- m. Keys are delivered to Owner.

.5 The Contractor has complied with all close-out requirements of the Contract Documents.

9.10.7 The opening date is the date that the Project is open for business with the public.

**ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

**10.2 SAFETY OF PERSONS AND PROPERTY:**

*Add the following clause to 10.2.2:*

10.2.7.1 The structure is designed to support the loads of the finished building. No provision is included for stress or loads imposed by construction operations.

**ARTICLE 11 INSURANCE**

**11.1 CONTRACTOR'S LIABILITY INSURANCE**

*Add the following clauses to 11.1.2:*

11.1.2.1 Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis including:

- 1. Premises Operations (including X, C and U coverages as applicable).
- 2. Independent Contractors' Protective.
- 3. Products and Completed Operations.
- 4. Personal Injury Liability with Employment Exclusion deleted.
- 5. Contractual, including specified provision for Contractor's obligation under Paragraph 3.18.
- 6. Owned, non-owned and hired motor vehicles.
- 7. Broad Form Property Damage including Completed Operations.

11.1.2.2 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or Retroactive Date shall predate the Contract; the termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Subparagraph 9.10.2.

11.1.2.3 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following limits or greater if required by law.

*Add the following to 11.1.2:*

- 1. Workers' Compensation:
  - (a) State: Statutory
  - (b) Applicable Federal (e.g., Longshoremen's): Statutory
  - (c) Employer's Liability: \$1,000,000 per Accident  
\$ 1,000,000 Disease, Policy Limit  
\$ 1,000,000 Disease, Each Employee
- 2. Comprehensive or Commercial General Liability (including Premises-Operations; Independent Contractors' Protective; Products and Completed Operations; Broad Form Property Damage):
  - (a) Bodily Injury:

- |     |  |                 |
|-----|--|-----------------|
|     | \$1,000,000  | Each Occurrence |
|     | \$2,000,000  | Aggregate       |
| (b) | Property Damage:   |                 |
|     | \$1,000,000  | Each Occurrence |
|     | \$2,000,000  | Aggregate       |
| (c) | Products and Completed Operations to be maintained for 2 years after final payment:                      |                 |
|     | \$2,000,000  | Aggregate       |
| (d) | Property Damage Liability Insurance shall provide X, C, and U coverage.                                  |                 |
| (e) | Broad Form Property Damage Coverage shall include Completed Operations.                                  |                 |
| 3.  | Contractual Liability:   |                 |
| (a) | Bodily Injury:   |                 |
|     | \$1,000,000  | Each Occurrence |
|     | \$2,000,000  | Aggregate       |
| (b) | Property Damage:   |                 |
|     | \$1,000,000  | Each Occurrence |
|     | \$2,000,000  | Aggregate       |
| 4.  | Personal Injury, with Employment Exclusion deleted:  |                 |
|     | \$1,000,000  | Aggregate       |
| 5.  | Business Auto Liability (including owned, non-owned and hired vehicles):                                 |                 |
| (a) | Bodily Injury:   |                 |
|     | \$1,000,000  | Each Person     |
|     | \$1,000,000  | Each Occurrence |
| (b) | Property Damage:   |                 |
|     | \$1,000,000  | Each Occurrence |
| 6.  | If the General Liability coverages are provided by a Commercial Liability policy, the:                   |                 |
| (a) | General Aggregate shall be not less than \$2,000,000 and it shall apply, in total, to this Project only. |                 |
| (b) | Fire Damage Limit shall be not less than \$500,000 on any one fire.                                      |                 |
| (c) | Medical Expense Limit shall be not less than \$10,000 on any one person.                                 |                 |
| 7.  | Umbrella Excess Liability:   |                 |
|     | \$2,000,000 retention for self-insured hazards each occurrence.  |                 |

*Add the following sentence to subparagraph 11.1.3:*

If this insurance is written on the Comprehensive General Liability policy form, the Certificates shall be AIA Document G705, Certificate of Insurance. If this insurance is written on a Commercial General

Liability policy form, ACORD form 25S will be acceptable. The Contractor and all Subcontractors shall name the Owner as additionally insured on any and all insurance coverage relating to the Work and as covered in the Contract Documents.

*Add the following subparagraphs 11.1.5 through 11.1.9:*

- 11.1.5 The Contractor shall provide Insurance Coverage which shall allow Partial Occupancy or use of the premises by the Owner as is necessary for the Owner to operate, or prepare to operate its business operations per the Project Schedule. Partial Occupancy by the Owner shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall not, without mutual written consent, take action with respect to Partial Occupancy or use that would cause cancellation, lapse, or reduction of insurance. Any and all additional insurance coverage required to allow Partial Occupancy or use of the premises by the Owner as is necessary for the Owner to operate, or prepare to operate its business operations per the Project Schedule shall be the responsibility of the Contractor to supply and maintain per the Contract Documents.
- 11.1.6 The Contractor shall require all Subcontractors performing design and other Architectural or engineering services hereunder to maintain professional errors and omissions coverage in connection with subcontracted work. All professional errors and omissions insurance shall be endorsed to provide contractual liability coverage, shall be in amounts approved by the Owner prior to the execution of any Subcontract including design or engineering responsibilities, and shall be maintained for such period as may be specified by the Owner (which will extend, at a minimum, through the applicable warranty period). Certificates of such coverage shall be filed with the Owner.
- 11.1.7 Loss of Use Insurance: The Contractor, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. Unless agreed to in writing by the Owner and the Contractor, the Owner does not waive all rights of action against the Contractor for Loss of Use of the Owner's property, including consequential losses due to fire or other hazards however caused.
- 11.1.8 All insurance required to be maintained by the Contractor shall be written on an Occurrence basis, if the same is commercially available.
- 11.1.9 If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

## 11.2 OWNER'S LIABILITY INSURANCE

### 11.2.1.1 Add the following:

The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the Contract.

*Add the following subparagraphs 11.2.4 through 11.2.8:*

- 11.2.4 The Owner may, at the Owner's option, purchase and maintain a Difference in Conditions Policy with respect to the Work at the Site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors, and Sub- Subcontractors in the Work but will not cover tools, equipment or other property used or consumed on the Site but not incorporated into the Project. This insurance will be an all-risk policy with the following exclusions: Those perils insured under the fire and extended coverage policy; infidelity or dishonesty of insured or employees; faulty or defective workmanship or materials; loss caused by fault, defect, error or omission in design, plans or specifications or testing; electrical injury;

explosion from boilers and/or pressure vessels; errors in processing; delay, loss of market, bankruptcy, foreclosure, deterioration; latent defect, inherent vice, moth vermin, wear, tear, contamination, pollution; loss by settling, shrinkage or expansion in foundation, walls, floors or ceilings; nuclear reaction or radiation or contamination; hostile or warlike action; insurrection, rebellion, revolution, civil war, usurped power or action taken by governmental authority; interruption of business or other consequential loss extending beyond direct physical loss or changes of temperature, shrinkage, evaporation, loss of weight, leakage of contents, breakage of glass, marring, scratching, rust, exposure to light, or changes in color or texture of finish. The Contractor and/or Subcontractors shall provide coverage for their tools, equipment or other property used or consumed on the Site but not incorporated in the Project and any other interests not covered above. The Contractor shall be responsible for the deductible portion of any loss arising from theft losses.

- 11.2.5 The Owner may, at the Owner's option, purchase and maintain Comprehensive General Liability CGL Insurance coverage for claims arising from bodily injury and property damage including Asbestos Abatement Coverage with respect to the ACM Abatement Work, if any. The Contractor shall make certain that the ACM Abatement Subcontractor does not include in its bid, or otherwise charge for, any comparable insurance with it maintains."
- 11.2.6 If during the Project construction period, the Owner insures properties, real or personal or both, adjoining 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, the Owner may waive rights for damages caused by fire or other perils covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.
- 11.2.7 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insured, as their interest may appear, subject to requirements of any applicable mortgagee clause and as per this document. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payment to their Sub-Subcontractors in similar manner.
- 11.2.8 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection be made, arbitrators shall be appointed. The Owner as fiduciary shall, in that case, make settlement with insurers in accordance with directions of such arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

## 11.6 PROPERTY INSURANCE

### 11.6.1 Add the following sentences:

The form of policy for this coverage shall be Completed Value. If the Owner is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto.

### 11.6.1.2 Add the following:

The Contractor shall provide insurance coverage for portions of the Work stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit.

## **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

### 12.2 CORRECTION OF WORK

*Add the following clauses to 12.2.1:*

12.2.1.2 If it becomes necessary for the Contractor to replace an item under the terms of the Contract Documents, the one (1) year period of time for the replacement shall begin with the date of replacement.

12.2.1.3 Guarantee

Unless otherwise specified, the Contractor shall guarantee all materials and workmanship for a period of one (1) year from the date of substantial completion of the project and shall replace, without cost to the Owner, or interference with the Owner's operation, any defective workmanship or materials. In the case of equipment, the guarantee shall cover all component parts such as valves, switches, etc. The Contractor shall continue to provide even beyond the one (1) year guarantee period, without limitation, such additional replacements or repairs required to correct all defective workmanship and materials for which the Owner has given written notice to the original failure of compliance with Contract Documents prior to the expiration of the aforesaid one (1) year period.

**ARTICLE 16 AUDIT (New Article)**

16.1 OWNER'S ACCESS TO CONTRACTOR'S RECORDS

16.1.1 The Contractor agrees that the Owner or any duly authorized representatives shall, until the expiration of three (3) years after final payment under this Agreement, have access to and the right to examine and audit any directly pertinent books, documents, papers and records of the Contractor involving transactions related to the Contract. The term "Subcontracts," as used in the clause only, excludes (1) purchase orders not exceeding Two Thousand Five Hundred Dollars (\$2,500.00) and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

16.1.1.2 The periods of access and examination described in this Section 15.1 for records which relate to (1) appeals under the "Claims" clause of the Construction Contract, (2) litigation or the settlement of claims arising out of the performance of this Agreement, or (3) costs and expenses of this Agreement as to which exception has been taken by the Owner or any of his duly authorized representatives, shall continue until such appeal, litigation, claim, or exception has been disposed of.

**END OF SECTION**

**SECTION 01 1000**  
**SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: NEW ENTRY
- B. Owner's Name: EMMANUEL EVANGELICAL LUTHERAN CHURCH.
- C. Architect's Name: The Architectural Group, Inc.
- D. The Project consists of the EXPANSION of Existing Entry and associated remodeling.

**1.02 CONTRACT DESCRIPTION**

**1.03 DESCRIPTION OF ALTERATIONS WORK**

- A. Scope of alterations work is indicated on drawings.

**1.04 WORK BY OWNER**

- A. Owner will award contracts for construction of site work as indicated which will be performed simultaneous and in coordination with the work.
- B. Owner will supply and install the following:
  - 1. Security Systems.
  - 2. Grading and paving except as indicated.
  - 3. Cupola Lighting System
  - 4. Landscaping, except as indicated.

**1.05 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

**1.06 CONTRACTOR USE OF SITE AND PREMISES**

- A. Arrange use of site and premises to allow:
  - 1. Owner occupancy.
- B. Provide access to and from site as required by law and by Owner:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Time Restrictions:
  - 1. Limit conduct of the hours of 7 am to 5 pm, Monday thru Saturday.
  - 2. Clean-up shall be scheduled to leave the site safe and suitable for Sunday morning services.
- D. Utility Outages and Shutdown:
  - 1. Limit disruption of utility services to hours the building is unoccupied.
  - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days' notice to Owner and authorities having jurisdiction.
  - 3. Prevent accidental disruption of utility services to other facilities.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 2300  
ALTERNATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Description of Alternates.
- B. Procedures for pricing Alternates.
- C. Documentation of changes to Contract Price and Contract Time.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 2113 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.

**1.03 ACCEPTANCE OF ALTERNATES**

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

**1.04 SCHEDULE OF ALTERNATES**

- A. Alternate No. 1 – **Additional CARPET TILING.**
  - 1. Base Bid Item: Existing carpet in FOYER 111 to remain.
  - 2. Alternate Item: Remove existing carpet and install new TILE CARPETING per Specification SECTION 09 6813 from interior face of VEST 141 to South entry.
- B. Alternate No. 2 – **Delete PAINTING.**
  - 1. Base Bid Item: Paint new and existing construction per Sheet A and Specification SECTION 09 9123.
  - 2. Alternate Item: Delete all INTERIOR PAINTING.
- C. Alternate No. 3 – **Partial ROOF REPLACEMENT.**
  - 1. Base Bid Item: Existing EPDM Membrane to remain.
  - 2. Alternate Item: Remove existing EPDM Membrane and install additional 1 ½” rigid insulation and new EPDM membrane per SHEET A --- and Specification SECTION 07 5323.
- D. Alternate No. 4 – Replace **NURSERY WINDOWS.**
  - 1. Base Bid Item: Existing Windows to remain.
  - 2. Alternate Item: Remove existing windows and install new windows per SHEET A --- and Specification SECTION 07 5323.
- E. Alternate No. 5 – **Delete CUPOLA AND LIGHTING.**
  - 1. Base Bid Item: Provide new Cupola and Lighting at Entry Canopy indicated on SHEETS A1.4, A2.1, A2.2, A3.3, A4.5, and E ?.
  - 2. Alternate Item: Delete Cupola and Lighting

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 3000**  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Submittal procedures.

**1.02 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Owner will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  - 5. Designation of personnel representing the parties to Contract, \_\_\_\_\_ and Architect.
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

**3.02 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Contractor's superintendent.
  - 5. Major subcontractors.
- D. Agenda:

1. Review minutes of previous meetings.
  2. Review of work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Maintenance of progress schedule.
  7. Corrective measures to regain projected schedules.
  8. Planned progress during succeeding work period.
  9. Maintenance of quality and work standards.
  10. Effect of proposed changes on progress schedule and coordination.
  11. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.03 CONSTRUCTION PROGRESS SCHEDULE**

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

### **3.04 SUBMITTAL SCHEDULE**

- A. Submit to Architect for review a schedule for submittals in tabular format.
  1. Submit at the same time as the Construction Progress Schedule.
  2. Format schedule to allow tracking of status of submittals throughout duration of construction.
  3. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
    - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

### **3.05 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.

### **3.06 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  1. Design data.
  2. Certificates.
  3. Test reports.
  4. Inspection reports.
  5. Manufacturer's instructions.

### **3.07 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.

- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7000 – CLOSEOUT REQUIREMENTS:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties.
- D. Submit for Owner's benefit during and after project completion.

### **3.08 NUMBER OF COPIES OF SUBMITTALS**

- A. Documents for Review:
  - 1. Small Size Sheets, Not Larger Than 8-1/2 by 11 inches: Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
  - 2. Larger Sheets, Not Larger Than 36 by 48 inches: Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- B. Documents for Information: Submit two copies.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  - 1. After review, produce duplicates.
  - 2. Retained samples will not be returned to Contractor unless specifically so stated.

### **3.09 SUBMITTAL PROCEDURES**

- A. General Requirements:
  - 1. Transmit using approved form.
    - a. Use Contractor's form, subject to prior approval by Architect.
  - 2. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  - 3. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
  - 4. Schedule submittals to expedite the Project, and coordinate submission of related items.
  - 5. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
  - 6. Provide space for Contractor and Architect review stamps.
  - 7. When revised for resubmission, identify all changes made since previous submission.
- B. Product Data Procedures:
  - 1. Submit only information required by individual specification sections.
  - 2. Collect required information into a single submittal.
- C. Shop Drawing Procedures:
  - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
  - 2. Do not reproduce the Contract Documents to create shop drawings.
  - 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
  - 1. Transmit related items together as single package.
  - 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

**END OF SECTION**

**SECTION 01 4000**  
**QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Testing and inspection agencies and services.
- B. Control of installation.
- C. Defect Assessment.

**1.02 TESTING AND INSPECTION AGENCIES AND SERVICES**

- A. The Owner shall obtain the services for a qualified testing agency for the purpose of inspecting and testing specific items of the Work as required by the Drawings and Specifications. Including but not limited to:
  - 1. Concrete
  - 2. Sub-soil compaction
  - 3. Welding
- B. Contractor shall coordinate and schedule inspections with the Owner's agency.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 CONTROL OF INSTALLATION**

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

**3.02 TESTING AND INSPECTION**

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
  - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 2. Perform specified sampling and testing of products in accordance with specified standards.
  - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
  - 5. Perform additional tests and inspections required by Architect.
  - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency may not approve or accept any portion of the Work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

### **3.03 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Owner, it is not practical to remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

**END OF SECTION**

**SECTION 01 5000**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary utilities.
- B. Temporary sanitary facilities.

**1.02 TEMPORARY UTILITIES**

- A. Owner will provide the following:
  - 1. Electrical power and metering.
  - 2. Water supply, metering and cost.
  - 3. Connection and removal is responsibility of the Contractor.

**1.03 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted.
- C. Maintain daily in clean and sanitary condition.
- D. At end of construction, return facilities to same or better condition as originally found.

**1.04 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

**1.05 INTERIOR ENCLOSURES**

- A. Provide temporary partitions as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

**1.06 VEHICULAR ACCESS AND PARKING**

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

**1.07 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition. SITE SHALL ALWAYS BE CLEANED IN ANTICIPATION OF SUNDAY MORNING SERVICES.
- B. Provide containers with lids. Remove trash from site periodically.

- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

**1.08 FIELD OFFICES**

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

**1.09 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 7000**  
**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Cutting and patching.
- C. Surveying for laying out the work.
- D. Cleaning and protection.
- E. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

**1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of Owner or separate Contractor.

**1.03 QUALIFICATIONS**

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

**1.04 PROJECT CONDITIONS**

- A. Use of explosives is not permitted.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

**1.05 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

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

### **3.03 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.

- 3. Building foundation, column locations and ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

### **3.04 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.05 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- I. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.06 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. SITE SHALL ALWAYS BE LEFT IN SUITABLE CONDITION IN ANTICIPATION OF SUNDAY MORNING SERVICES.
- B. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

- C. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.07 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

### **3.08 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.09 FINAL CLEANING**

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

### **3.10 CLOSEOUT PROCEDURES**

- A. Accompany Architect on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- B. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- C. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- D. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- F. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

**END OF SECTION**

**SECTION 02 4100  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of building elements for alteration purposes.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- C. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- E. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- F. Section 31 2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Fill Material: As specified in Section 31 2323 - Fill.

**PART 3 EXECUTION**

**3.01 SCOPE**

- A. Remove paving and curbs as required to accomplish new work.
- B. Within area of new construction, remove foundation walls and footings to a minimum of 2 feet below finished grade.
- C. Remove concrete slabs on grade within site boundaries.
- D. Remove other items indicated, for salvage, relocation, recycling, and \_\_\_\_\_.
- E. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 31 2200.

**3.02 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as indicated.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- C. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  3. Verify that abandoned services serve only abandoned facilities before removal.
  4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- E. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
  4. Patch as specified for patching new work.

### **3.03 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 03 3000**  
**CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete formwork.
- B. Floors and slabs on grade.
- C. Concrete foundations and anchor bolts for pre-engineered building.
- D. Concrete reinforcement.
- E. Joint devices associated with concrete work.
- F. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.
- G. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- B. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
- E. ACI 305R - Hot Weather Concreting; 2010.
- F. ACI 306R - Cold Weather Concreting; 2010.
- G. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
- H. ACI 347R - Guide to Formwork for Concrete; 2014.
- I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- J. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2009 (Reapproved 2015).
- K. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- L. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- M. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016.
- N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2016b.
- O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2016a.
- P. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.
- Q. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- R. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.

- S. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- T. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- U. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- V. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- W. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes; 2001 (Reapproved 2012).
- X. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2010.
- Y. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2014.
- Z. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014.
- AA. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete; 2010a (Reapproved 2015).
- AB. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.
- AC. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.
- AD. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996 (Reapproved 2008).
- AE. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric); 2014.
- AF. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011.
- AG. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.
- AH. COE CRD-C 513 - COE Specifications for Rubber Waterstops; 1974.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
  - 2. Indicate proposed mix design complies with fiber reinforcing manufacturer's written recommendations.
- D. Samples: Submit samples of underslab vapor retarder to be used.
- E. Test Reports: Submit report for each test or series of tests specified.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.



## **PART 2 PRODUCTS**

### **2.01 FORMWORK**

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
  - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
  - 2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
  - 3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
  - 4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

### **2.02 REINFORCEMENT MATERIALS**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
  - 1. Type: Deformed billet-steel bars.
  - 2. Finish: Galvanized in accordance with ASTM A767/A767M, Class I, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
- C. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  - 3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
- C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
- D. Structural Fiber Reinforcement: ASTM C1116/C1116M.

### **2.04 ADMIXTURES**

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.

### **2.05 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
  - 1. Installation: Comply with ASTM E1643.
  - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Grout: Comply with ASTM C1107/C1107M.
  - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

- C. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
  - 1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.
    - a. Maximum Height Change: Plus 4 percent.
    - b. Minimum Height Change: Plus 1 percent.
  - 2. Minimum Compressive Strength at 7 days, ASTM C579: 12,000 pounds per square inch.

## 2.06 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System:
  - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- B. Waterstops: Rubber, complying with COE CRD-C 513.
- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
- D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

## 2.07 CURING MATERIALS

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
- B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
  - 1. Product dissipates within 4 to 6 weeks.
  - 2. Provide product containing fugitive red dye.
- C. Curing and Sealing Compound, Moisture Emission Reducing, Membrane-Forming: Liquid, membrane-forming, clear sealer, for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.
  - 1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
  - 2. Comply with ASTM C309 and ASTM C1315 Type I Class A.
  - 3. VOC Content: Less than 100 g/L.
  - 4. Solids Content: 25 percent, minimum.
- D. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
  - 1. Vehicle: Water-based.
  - 2. Solids by Mass: 25 percent, minimum.
  - 3. VOC Content: OTC compliant.
- E. Curing and Sealing Compound, High Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
  - 1. Vehicle: Solvent-based.
  - 2. Solids by Mass: 25 percent, minimum.
  - 3. VOC Content: Ozone Transport Commission (OTC) compliant.
- F. Moisture-Retaining Sheet: ASTM C171.
- G. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.
- H. Water: Potable, not detrimental to concrete.

## 2.08 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- E. Normal Weight Concrete:
  1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch.
  2. Water-Cement Ratio: Maximum 40 percent by weight.
  3. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
  4. Maximum Slump: 3 inches.
  5. Maximum Aggregate Size: 5/8 inch.

## **2.09 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
  1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
- E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- F. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
  1. Granular Fill Over Vapor Retarder: Cover vapor retarder with compactible granular fill as indicated on drawings. Do not use sand.

### **3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

### 3.04 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### 3.05 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
  - 1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
- E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

### 3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Correct the slab surface if tolerances are less than specified.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
  - 1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
  - 2. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
  - 3. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
  - 4. Warehouse Floors On Grade: F(F) of \_\_\_\_; F(L) of \_\_\_\_.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### 3.07 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
  3. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
  2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
  3. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
  4. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

### 3.08 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
  1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
  2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
    - a. Spraying: Spray water over floor slab areas and maintain wet.
    - b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
  3. Final Curing: Begin after initial curing but before surface is dry.

### 3.09 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
- D. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

- E. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

**3.10 DEFECTIVE CONCRETE**

- A. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

**3.11 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

**SECTION 04 2000**  
**UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Burnished Masonry units.
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Lintels.
- G. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.
- B. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2013.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- F. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2018.
- G. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.
- H. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016.
- I. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- J. ASTM C126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units; 2016.
- K. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2014a.
- L. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- M. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.
- N. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- O. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2016.
- P. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- Q. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.
- R. ASTM C476 - Standard Specification for Grout for Masonry; 2010.

- S. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- T. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.
- U. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015.
- V. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.
- W. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.
- X. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- Y. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2005.
- Z. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- AA. UL (FRD) - Fire Resistance Directory; current edition.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

#### **1.05 QUALITY ASSURANCE**

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Fire Rated Assemblies: Comply with applicable code for UL (FRD) Assembly as noted on the drawings.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

### **PART 2 PRODUCTS**

#### **2.01 BURNISHED MASONRY UNITS**

- A. Manufacturer:
  1. County Materials Corporation  
205 North St. P. O. Box 100; Marathon, WI 54448-0100  
Toll Free Tel: 800-242-7733; Tel: 715-848-1365; Fax: 715-443-3691;  
Email: request info (info@countymaterials.com);  
Web: www.countymaterials.com

Burnished Concrete Block: Comply with referenced standards and as follows:

1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
  - a. Premier Ultra Burnished Masonry Units
  - b. Color: Echo (63-251B)
2. Special Shapes: Provide non-standard blocks:
  - a. Banding unit – dimension as indicated on the drawings.
  - b. Units configured for corners.
3. Load-Bearing Units: ASTM C90, normal weight.
  - a. Hollow block, as indicated.
4. Non-Loadbearing Units: ASTM C129.
  - a. Hollow block, as indicated.
  - b. Medium weight.



## 2.02 BRICK UNITS

### A. Manufacturer:

1. Redland Brick Inc.  
15718 Clear Spring Road  
P.O. Box 160  
Williamsport, MD 21795  
Phone: 301-223-7700  
Web: <https://www.redlandbrick.com/onlinecatalog/brick-colors/cushwa-brick>

Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.

1. Color and texture to match existing brick.
  - a. Cushwa: Rose Full Range (030)
2. Nominal size: Match existing brick size and profile.
3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
4. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

## 2.03 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type N.
  1. Colored Mortar: Premixed cement as required to match Architect's color sample.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
  1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
  1. Color(s): As selected by Architect from manufacturer's full range.
- G. Water: Clean and potable.
- H. Accelerating Admixture: Nonchloride type for use in cold weather.
- I. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.

## 2.04 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
  1. Blok-Lok Limited; \_\_\_\_\_: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
  2. Hohmann & Barnard, Inc; X-Seal Anchor: [www.h-b.com/#sle](http://www.h-b.com/#sle).
  3. WIRE-BOND; \_\_\_\_\_ [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- D. Single Wythe Joint Reinforcement: Ladder type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- E. Multiple Wythe Joint Reinforcement: Ladder type; fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

- F. Adjustable Multiple Wythe Joint Reinforcement: Truss type with adjustable ties or tabs spaced at 16 in on center and fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
  - 1. Vertical adjustment: Not less than 2 inches.
  - 2. Seismic Feature: Provide lip, hook, or clip on extended leg of wall ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.
  - 3. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.
- G. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M, Class B.
- H. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
- I. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not less than 5/8 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.
- J. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
  - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
  - 3. Vertical adjustment: Not less than 3-1/2 inches.
  - 4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.

## 2.05 FLASHINGS

- A. Plastic Flashings: Sheet polyolefin laminated to polypropylene; 40 mil thick.
  - 1. Manufacturers:
    - a. Hohmann & Barnard, Inc; Textroflash: [www.h-b.com/#sle](http://www.h-b.com/#sle).
- B. Copper/Kraft Paper Flashings: 3 oz/sq ft sheet copper bonded to fiber reinforced asphalt treated Kraft paper.
  - 1. Manufacturers:
    - a. Hohmann & Barnard, Inc; \_\_\_\_: [www.h-b.com/#sle](http://www.h-b.com/#sle).
- C. EPDM Flashing: ASTM D4637/D4637M, Type I, 0.040 inch thick.
  - 1. Manufacturers:
- D. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

## 2.06 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
  - 1. Manufacturers:
    - a. Blok-Lok Limited; [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
    - b. Hohmann & Barnard; Inc [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - c. WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.

1. Manufacturers:
  - a. Hohmann & Barnard, Inc; [www.h-b.com/#sle](http://www.h-b.com/#sle).
  - b. WIRE-BOND; [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
  1. Full-Height Airspace Maintenance and Drainage Material: Mesh panels, fitted between masonry ties.
    - a. Manufacturers:
      - 1) Advanced Building Products, Inc.; Mortairvent-CW: [www.advancedbuildingproducts.com/#sle](http://www.advancedbuildingproducts.com/#sle).
      - 2) CavClear/Archovations, Inc; CavClear Masonry Mat: [www.cavclear.com/#sle](http://www.cavclear.com/#sle).
      - 3) CavClear/Archovations, Inc; CavClear Polyisocyanurate Insulation System: [www.cavclear.com/#sle](http://www.cavclear.com/#sle).
- D. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- E. Nailing Strips: Softwood lumber, preservative treated; as specified in Section 06 1000.
- F. Weeps:
  1. Type: Cotton rope.
- G. Cavity Vents:
  1. Type: Preformed aluminum vents with sloping louvers.
  2. Manufacturers:
    - a. Blok-Lok Limited; \_\_\_\_\_: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
    - b. Hohmann & Barnard, Inc; \_\_\_\_\_: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - c. WIRE-BOND; \_\_\_\_\_: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
- H. Drainage Fabric: Polyester or polypropylene mesh.
  1. Manufacturers:
    - a. Advanced Building Products, Inc.; Mortairvent: [www.advancedbuildingproducts.com/#sle](http://www.advancedbuildingproducts.com/#sle).
    - b. Mortar Net Solutions; \_\_\_\_\_: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
    - c. York Manufacturing, Inc; Weep Armor Weep Vent Protection: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
- I. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## 2.07 LINTELS

- A. Precast Concrete Lintels: \_\_\_\_\_ type, \_\_\_\_by\_\_\_\_ inch size, \_\_\_\_ psi strength at 28 days.
- B. Prefabricated Steel Lintels:
- C. Brickwork Support System: Offset steel relief angles or lintels with hanger brackets for support of brickwork above horizontal masonry joints and openings to allow insulation to span continuously behind brick and eliminate continuous thermal bridges associated with support systems that interrupt continuous insulation.

## 2.08 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  1. Masonry below grade and in contact with earth: Type S.
  2. Exterior, loadbearing masonry: Type N.
  3. Exterior, non-loadbearing masonry: Type N.
  4. Interior, loadbearing masonry: Type N.
  5. Interior, non-loadbearing masonry: Type O.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 PREPARATION**

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

#### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

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

#### **3.04 COURSING**

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

#### **3.05 PLACING AND BONDING**

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

#### **3.06 WEEPS/CAVITY VENTS**

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

- B. Install cavity vents in veneer and cavity walls at 24 inches on center horizontally below shelf angles and lintels and near top of walls.

### **3.07 CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions. Verify that airspace width is no more than 3/8 inch greater than panel thickness. Install horizontally between joint reinforcement. Stagger end joints in adjacent rows. Fit to perimeter construction and penetrations without voids.
- D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### **3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHER MASONRY, AND CAVITY WALL MASONRY**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce joint corners and intersections with strap anchors 16 inches on center.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

### **3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHER MASONRY**

- A. Install horizontal joint reinforcement 8 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce joint corners and intersections with strap anchors 16 inches on center.

### **3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches.
- D. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 2-2/3 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- E. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 2-2/3 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- F. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.
- G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### **3.11 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY**

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of openings.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically.
- F. Reinforce joint corners and intersections with strap anchors 16 inches on center.

### **3.12 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY**

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically.
- G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### **3.13 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
  - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
  - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
  - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Metal flashing to be installed at base of masonry walls. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- C. Extend plastic, laminated, and EPDM flashings to within 1/4 inch of exterior face of masonry.
- D. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

### **3.14 LINTELS**

- A. Install precast concrete lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
  - 1. Openings to 42 inches: Place two, No. 3 reinforcing bars 1 inch from bottom web.
  - 2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
  - 3. Openings over 78 inches: Reinforce openings as detailed.
  - 4. Do not splice reinforcing bars.
  - 5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
  - 6. Place and consolidate grout fill without displacing reinforcing.
  - 7. Allow masonry lintels to attain specified strength before removing temporary supports.

- C. Maintain minimum 8 inch bearing on each side of opening.
- D. Install thermal brick support system in accordance with manufacturer's instructions at locations indicated on drawings

### **3.15 GROUTED COMPONENTS**

- A. Reinforce bond beams with 2, No. 4 bars, 1 inch from bottom web.
- B. Lap splices minimum 24 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

### **3.16 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.
- D. Form expansion joint as detailed on drawings.

### **3.17 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
  - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

### **3.18 TOLERANCES**

- A. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

### **3.19 CUTTING AND FITTING**

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

### **3.20 CLEANING**

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

### **3.21 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**



**SECTION 05 1200**  
**STRUCTURAL STEEL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural steel framing members, support members, sag rods, and struts.
- B. Base plates, shear stud connectors and expansion joint plates.
- C. Grouting under base plates.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

**1.03 REFERENCE STANDARDS**

- A. AISC (MAN) - Steel Construction Manual; 2011.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2010.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- G. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2004 (Reapproved 2009).
- H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- I. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.
- J. ASTM A490M - Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric); 2014a.
- K. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).
- N. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc; 2011.
- O. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2009.
- P. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- Q. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
  - 2. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

## **1.05 QUALITY ASSURANCE**

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Steel Shapes, Plates, and Bars: ASTM A242/A242M high-strength, corrosion-resistant structural steel.
- B. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.
- C. Pipe: ASTM A53/A53M, Grade B, Finish black.
- D. Sag Rods: ASTM A36/A36M.
- E. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class C.
- F. High-Strength Structural Bolts: 5 or 2; Type 1 alloy steel, with matching compatible 4 or 1 nuts and 3 washers.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
  - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

### **2.02 FABRICATION**

- A. Shop fabricate to greatest extent possible.
- B. Fabricate connections for bolt, nut, and washer connectors.
- C. Develop required camber for members.

### **2.03 FINISH**

- A. Prepare structural component surfaces in accordance with SSPC-SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

### **3.02 ERECTION**

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components and shear studs indicated on shop drawings.
- D. Do not field cut or alter structural members without approval of Architect.
- E. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

- F. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

**3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

**3.04 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least \_\_\_\_ percent of bolts at each connection.
- C. Welded Connections: Visually inspect all field-welded connections and test at least \_\_\_\_ percent of welds using one of the following:

**END OF SECTION**

**SECTION 05 5000**  
**METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel items.
- B. Prefabricated ladders and ship ladders.
- C. Guardrails and Handrails

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.

**1.03 REFERENCE STANDARDS**

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- F. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- H. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2012.
- I. ASTM B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes (Metric); 2012.
- J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).
- M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- O. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

### **2.02 MATERIALS - ALUMINUM**

- A. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 (ASTM B210M), 6063 alloy, T6 temper.
- B. Bolts, Nuts, and Washers: Stainless steel.

### **2.03 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### **2.04 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- C. Lintels: As detailed; prime paint finish.
- D. Recessed Mat Frames : As detailed; steel, galvanized finish.

### **2.05 FINISHES - STEEL**

- A. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for \_\_\_\_\_ finish.
  - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Prime Painting: One coat.
- D. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

### **2.06 FINISHES - ALUMINUM**

- A. Exterior Aluminum Surfaces: Class I color anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.

## **2.07 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

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

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.
- D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**

**SECTION 06 1000  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-structural dimension lumber framing.
- B. Rough opening framing for doors, windows, and roof openings.
- C. Subflooring.
- D. Underlayment.
- E. Roof-mounted curbs.
- F. Roofing nailers.
- G. Roofing cant strips.
- H. Preservative treated wood materials.
- I. Fire retardant treated wood materials.
- J. Concealed wood blocking, nailers, and supports.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 05 1200 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.
- C. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
- D. Section 07 2500 - Weather Barriers: Air barrier over sheathing.
- E. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

**1.03 REFERENCE STANDARDS**

- A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2015.
- B. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2012.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- E. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- G. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.
- H. ICC (IECC) - International Energy Conservation Code; 2012.
- I. PS 1 - Structural Plywood; 2009.
- J. WWPA G-5 - Western Lumber Grading Rules; 2011.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

## **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Western Wood Products Association; WWPA G-5.
- B. Sizes: Nominal sizes as indicated on drawings, Rough (unsurfaced).
- C. Moisture Content: Kiln-dry or MC15.
- D. Stud Framing (2 by 2 through 2 by 6 ):
  - 1. Species: Any allowed under referenced grading rules.
  - 2. Grade: No. 2.
- E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 ):
  - 1. Species: Any allowed under grading rules.
  - 2. Grade: No. 1 & Btr.
- F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

### **2.03 CONSTRUCTION PANELS**

- A. Subfloor/Underlayment Combination: Oriented strand board wood structural panel; PS 2, rated Single Floor.
  - 1. Bond Classification: Exterior.
  - 2. Performance Category: 19/32 PERF CAT.
  - 3. Edges: Tongue and groove.
  - 4. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 200 days.
  - 5. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches, 19.2 inches and 24 inches on center, respectively.
  - 6. Warranty: Manufacturer's standard 50 year limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
- B. Roof Sheathing: Any PS 2 type, rated Structural I Sheathing.
  - 1. Bond Classification: Exterior.
  - 2. Span Rating: 60.
  - 3. Performance Category: 3/4 PERF CAT.
- C. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 5/8 inch Type X fire resistant.
  - 1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.



2. Edges: Square.
3. Manufacturers:
  - a. CertainTeed Corporation; GlasRoc Brand: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - b. Georgia-Pacific Gypsum; DensGlass Sheathing: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
- D. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- E. Other Applications:
  1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
  2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
  3. Other Locations: PS 1, C-D Plugged or better.

## 2.04 ACCESSORIES

- A. Fasteners and Anchors:
  1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
  3. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
- C. Subfloor Adhesives: Waterproof, air cure type, cartridge dispensed.
- D. Construction Adhesives:
- E. Building Paper: Water resistant Kraft paper.

## 2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
  1. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as indicated .
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
  1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber exposed to weather.
    - c. Treat lumber in contact with roofing, flashing, or waterproofing.
    - d. Treat lumber in contact with masonry or concrete.

- e. Treat lumber less than 18 inches above grade.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

#### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

#### **3.03 FRAMING INSTALLATION**

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual, and \_\_\_\_\_.
- E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- G. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.
- H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

#### **3.04 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- F. Provide the following specific non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Wall-mounted door stops.
  - 5. Chalkboards and marker boards.

6. Wall paneling and trim.
7. Joints of rigid wall coverings that occur between studs.

### **3.05 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

### **3.06 INSTALLATION OF CONSTRUCTION PANELS**

- A. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.
- B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  1. Nail panels to framing; staples are not permitted.
- C. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
- D. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  3. Install adjacent boards without gaps.

### **3.07 SITE APPLIED WOOD TREATMENT**

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

### **3.08 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **3.09 CLEANING**

- A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
  1. Comply with applicable regulations.
  2. Do not burn scrap on project site.
  3. Do not burn scraps that have been pressure treated.
  4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

**SECTION 06 2000**  
**FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Finish carpentry items.
- B. Hardware and attachment accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 08 1416 - Flush Wood Doors.
- C. Section 09 9123 - Interior Painting: Painting of finish carpentry items.

**1.03 REFERENCE STANDARDS**

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.
- G. BHMA A156.9 - American National Standard for Cabinet Hardware; 2010.
- H. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- I. PS 1 - Structural Plywood; 2009.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data:
  - 1. Provide data on fire retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
  - 2. Include certification program label.
- D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
  - 1. Provide labels or certificates indicating that the work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 2. Provide designated labels on shop drawings as required by certification program.
  - 3. Provide designated labels on installed products as required by certification program.
  - 4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect from moisture damage.

## **PART 2 PRODUCTS**

### **2.01 FINISH CARPENTRY ITEMS**

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.
- C. Interior Woodwork Items:
  - 1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.
  - 2. Window Sills: Clear fir; prepare for transparent finish.
  - 3. Stairs, Balustrades, and Handrails: Clear fir; prepare for stained finish.
  - 4. Valance Work: Clear fir; prepare for paint finish.
  - 5. Loose Shelving: Birch plywood; prepare for paint finish.

### **2.02 WOOD-BASED COMPONENTS**

- A. Wood fabricated from old growth timber is not permitted.

### **2.03 LUMBER MATERIALS**

- A. Softwood Lumber: \_\_\_\_\_ species, \_\_\_\_\_ sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
- B. Hardwood Lumber: \_\_\_\_\_ species, \_\_\_\_\_ sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

### **2.04 SHEET MATERIALS**

- A. Softwood Plywood, Not Exposed to View: Any face species, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- B. Softwood Plywood, Exposed to View: Face species as indicated, plain sawn, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- C. Particleboard: ANSI A208.1; Composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.

### **2.05 PLASTIC LAMINATE MATERIALS**

- A. Plastic Laminate: NEMA LD 3, HGS; color as selected by Architect; satin finish.
- B. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate; \_\_\_\_\_ manufactured by \_\_\_\_\_.
- C. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.

### **2.06 FASTENINGS**

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Fasteners: Of size and type to suit application; \_\_\_\_\_ finish in concealed locations and \_\_\_\_\_ finish in exposed locations.
- C. Concealed Joint Fasteners: Threaded steel.

### **2.07 ACCESSORIES**

- A. Lumber for Shimming and Blocking: Softwood lumber of \_\_\_\_\_ species.
- B. Plastic Edge Trim: Extruded flat shaped; smooth finish; self locking serrated tongue; of width to match component thickness; color as selected.

- C. Cellular PVC Trim and Moldings: Extruded, expanded PVC; UV-resistant, heat-stabilized, and rigid material; for exterior use only.
  - 1. Density: 31 pounds per cubic foot, minimum.
  - 2. Flame Spread: ASTM E84, 75, maximum.
- D. Plain Glass: ASTM C1036 annealed float glass, clear, 6 mm thick minimum.
- E. Safety Glass: ASTM C1048, fully tempered; clear; 1/8 inch thick, minimum.
- F. Primer: Alkyd primer sealer.

## **2.08 HARDWARE**

- A. Hardware: Comply with BHMA A156.9.

## **2.09 WOOD TREATMENT**

- A. Factory-Treated Lumber: Comply with requirements of AWPA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- C. Provide identification on fire retardant treated material.
- D. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- E. Redry wood after pressure treatment to maximum \_\_\_\_ percent moisture content.

## **2.10 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Cap exposed plastic laminate finish edges with plastic trim.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- E. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.

### **3.02 INSTALLATION**

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

### **3.03 TOLERANCES**

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

**END OF SECTION**

**SECTION 07 2100  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation and integral vapor retarder at cavity wall construction, perimeter foundation wall, underside of floor slabs, over roof deck, over roof sheathing, exterior wall behind \_\_\_\_\_ wall finish, and interior wall with facer providing exposed finish.
- B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.

**1.03 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- D. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2016.

**1.04 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 APPLICATIONS**

- A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
- B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- C. Insulation in Wood Framed Walls: Batt insulation with separate vapor retarder.
- D. Insulation in Wood Framed Ceiling Structure: Batt insulation with separate vapor retarder.

**2.02 FOAM BOARD INSULATION MATERIALS**

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
  - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
  - 4. Manufacturers:
    - a. Dow Chemical Company; STYROFOAM HIGHLOAD 40:  
[www.dowbuildingsolutions.com/#sle](http://www.dowbuildingsolutions.com/#sle).
    - b. Kingspan Insulation LLC; GreenGuard XPS TYPE IV 25 PSI:  
[www.trustgreenguard.com/#sle](http://www.trustgreenguard.com/#sle).
    - c. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation:  
[www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).

**2.03 BATT INSULATION MATERIALS**

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
  - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Formaldehyde Content: Zero.
5. Manufacturers:
  - a. CertainTeed Corporation; \_\_\_\_\_: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - b. Johns Manville; \_\_\_\_\_: [www.jm.com/#sle](http://www.jm.com/#sle).
  - c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).

## **2.04 ACCESSORIES**

- A. Sheet Vapor Retarder: Black polyethylene film for above grade application, 10 mil, 0.010 inch thick.
- B. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
  1. Application: Sealing of interior circular penetrations, such as pipes or cables.
  2. Width: Are required for application.
- C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- D. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- E. Wire Mesh: Galvanized steel, hexagonal wire mesh.
- F. Adhesive: Type recommended by insulation manufacturer for application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Install boards horizontally on foundation perimeter.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.

### **3.03 BOARD INSTALLATION AT EXTERIOR WALLS**

- A. Install boards horizontally on walls.
  1. Place boards to maximize adhesive contact.
  2. Install in running bond pattern.
  3. Butt edges and ends tightly to adjacent boards and to protrusions.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Tape insulation board joints.

### **3.04 BOARD INSTALLATION AT CAVITY WALLS**

- A. Install boards to fit snugly between wall ties.
- B. Install boards horizontally on walls.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### **3.05 BOARD INSTALLATION UNDER CONCRETE SLABS**

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.



- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

**3.06 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK**

- A. Installation of board insulation over low slope roof deck as specified in Section 07 5323.

**3.07 BOARD INSTALLATION OVER STEEP SLOPE ROOF SHEATHING OR ROOF STRUCTURE**

- A. Installation of board insulation over steep slope roof structure or roof sheathing is specified in Section 06 1000.

**3.08 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

**3.09 PROTECTION**

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

**END OF SECTION**

**SECTION 07 2500  
WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, joints around frames of openings in exterior walls, and \_\_\_\_\_ water vapor resistant and air tight.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 06 1000 - Rough Carpentry: Water-resistive barrier under exterior cladding.
- C. Section 07 2100 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.
- D. Section 07 9200 - Joint Sealants: Sealing building expansion joints.

**1.03 DEFINITIONS**

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
  - 1. Water Vapor Permeance: For purposes of conversion,  $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$ .
- D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

**PART 2 PRODUCTS**

**2.01 WEATHER BARRIER ASSEMBLIES**

- A. Interior Vapor Retarder:
  - 1. On inside face of masonry and concrete walls use vapor retarder coating.
  - 2. On elevated floors over enclosed soffit space use vapor retarder coating.

**2.02 WATER-RESISTIVE BARRIER MATERIALS (NEITHER AIR BARRIER OR VAPOR RETARDER)**

- A. Weather-Resistive Barrier, Composite: Tear-resistant polyester sheet with UV-resistant acrylic coating.
  - 1. Air Permeance: 0.178 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
  - 2. Water Vapor Permeance: 200 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
  - 3. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for up to 210 days of weather exposure.
  - 4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less (Class A), when tested in accordance with ASTM E84.
  - 5. Water Resistance: Comply with applicable water-resistive requirements of ICC-ES AC38.
  - 6. Seam and Perimeter Tape: As recommended by sheet manufacturer.

**2.03 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)**

- A. Air Barrier Sheet, Mechanically Fastened:
  - 1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
  - 2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).

3. Water Penetration Resistance: Withstand a water head of 21 inches, minimum, for minimum of 5 hours, when tested in accordance with AATCC Test Method 127.
  4. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 180 days of weather exposure.
  5. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
  6. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches wide, compatible with sheet material; unless otherwise specified.
- B. Air Barrier Sheet, Self-Adhered:
1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
  2. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
  3. Water Penetration Resistance Around Nails: Pass, when tested in accordance with ASTM D1970/D1970M (modified).
  4. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 90 days of weather exposure.
  5. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less (Class A), when tested in accordance with ASTM E84.
  6. Water Resistance: Comply with applicable water-resistive requirements of ICC-ES AC38.
  7. Seam and Perimeter Tape: As recommended by sheet manufacturer.
- C. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
1. Air Barrier Coating:
    - a. Material: Silica-fortified rubber.
    - b. Adhesion to Paper and Glass Mat Faced Sheathing: Sufficient to ensure failure due to delamination of sheathing.
    - c. Dry Film Thickness (DFT): 10 mil, 0.010 inch, minimum.
    - d. Air Permeance: 0.001 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
    - e. Water Vapor Permeance: 18 perms, minimum, when tested in accordance with ASTM E96/E96M, Procedure B.
    - f. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure after application.
    - g. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
    - h. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
    - i. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.
    - j. VOC Content: 100 g per L or less.
    - k. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
    - l. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
  2. Air Barrier Membrane:
    - a. Material: Water-based acrylic.
    - b. Acceptable Substrates: Stated by manufacturer as suitable for installation on visibly damp surfaces and concrete that has hardened but is not fully cured ("green" concrete) without requiring a primer.
    - c. Adhesion to Paper and Glass Mat Faced Sheathing: Sufficient to ensure failure due to delamination of sheathing.
    - d. Dry Film Thickness (DFT): 30 mil, 0.030 inch, minimum.
    - e. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
    - f. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M, Procedure B.
    - g. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to three months of weather exposure.

- h. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
- i. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- j. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.
- k. VOC Content: 100 g per L or less.
- l. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
- m. Sealants, Tapes and Accessories: As recommended by coating manufacturer.

#### **2.04 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)**

- A. Vapor Retarder Sheet Type \_\_\_\_: Butyl, black color.
  - 1. Thickness: 45 mil, 0.045 inch.
  - 2. Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M.
  - 3. Seam Lap and Perimeter Adhesive: Elastomeric, same composition as sheet or other compatible material.

#### **2.05 ACCESSORIES**

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
  - 1. Composition: Butyl rubber sheet laminated to elasticized polyethylene sheet.
  - 2. Thickness: 70 mil, 0.070 inch, nominal.
- C. Thinners and Cleaners: As recommended by material manufacturer.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept the work of this section.

#### **3.02 PREPARATION**

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

#### **3.03 INSTALLATION**

- A. Install materials in accordance with manufacturer's instructions.
- B. Water-Resistive Barriers: Install continuous barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.
- C. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- E. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- F. Mechanically Fastened Sheets - On Exterior:
  - 1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
  - 2. Overlap seams as recommended by manufacturer but at least 6 inches.
  - 3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
  - 4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
  - 5. Install water-resistive barrier over jamb flashings.

6. Install air barrier and vapor retarder UNDER jamb flashings.
  7. Install head flashings under weather barrier.
  8. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.
- G. Mechanically Fastened Sheets - Vapor Retarder On Interior:
1. When insulation is to be installed in assembly, install vapor retarder over insulation.
  2. Seal seams, laps, perimeter edges, penetrations, tears, and cuts with self-adhesive tape, making air tight seal.
  3. Locate laps at a framing member; at laps fasten one sheet to framing member then tape overlapping sheet to first sheet.
  4. Seal entire perimeter to structure, window and door frames, and other penetrations.
  5. Where conduit, pipes, wires, ducts, outlet boxes, and other items are installed in insulation cavity, pass vapor retarder sheet behind item but over insulation and maintain air tight seal.
- H. Self-Adhered Sheets:
1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
  2. Lap sheets shingle-fashion to shed water and seal laps air tight.
  3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
  4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
  5. At wide joints, provide extra flexible membrane allowing joint movement.
- I. Coatings:
1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
  2. Use flashing to seal to adjacent construction and to bridge joints.
- J. Openings and Penetrations in Exterior Weather Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
  2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
  3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
  4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
  5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
  6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

### **3.04 PROTECTION**

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

**END OF SECTION**

**SECTION 07 3113  
ASPHALT SHINGLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Asphalt shingle roofing.
- B. Flexible sheet membranes for eave protection and underlayment.
- C. Associated metal flashings and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Roof sheathing.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Edge and cap flashings.

**1.03 REFERENCE STANDARDS**

- A. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2015a.
- C. ASTM D3161/D3161M - Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method); 2016a.
- D. ASTM D3462/D3462M - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules; 2016.
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- G. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2011.
- H. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2015.
- I. NRCA (RM) - The NRCA Roofing Manual; 2017.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating material characteristics.
- C. Shop Drawings: For metal flashings, indicate specially configured metal flashings.
- D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color selection.
- E. Manufacturer's Installation Instructions: Indicate installation criteria and procedures.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.05 FIELD CONDITIONS**

- A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide lifetime manufacturer's warranty for coverage against black streaks caused by algae.
- D. Provide five year manufacturer's warranty for wind damage.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Asphalt Shingles:
  - 1. Atlas Roofing Corporation; \_\_\_\_\_: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
  - 2. GAF; Timberline HD Reflector Series: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  - 3. IKO Industries Inc; Armourshake: [www.iko.com/#sle](http://www.iko.com/#sle).
  - 4. Owens Corning Corp; \_\_\_\_\_: [www.owenscorning.com/#sle](http://www.owenscorning.com/#sle).

### **2.02 ASPHALT SHINGLES**

- A. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462/D3462M.
  - 1. Fire Resistance: Class A, complying with ASTM E108.
  - 2. Wind Resistance: Class A, when tested in accordance with ASTM D3161/D3161M.
  - 3. Warranted Wind Speed: Not greater than 90 mph.
  - 4. Weight: 235 lb/100 sq ft.
  - 5. Self-sealing type.
  - 6. Style: Match existing.
  - 7. Color: Match existing.

### **2.03 SHEET MATERIALS**

- A. Eave Protection Membrane:
  - 1. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil total thickness; with strippable treated release paper and polyethylene sheet top surface.
- B. Underlayment: Self-adhering rubber-modified asphalt sheet complying with ASTM D1970/D1970M; 22 mil total thickness; with strippable release film and woven polypropylene sheet top surface.
  - 1. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
  - 2. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
  - 3. Water Vapor Permeance: 0.067 perm, when tested in accordance with ASTM E96/E96M, Procedure A (desiccant method).
  - 4. Performance: Meet or exceed requirements for ASTM D226/D226M, Type II asphalt-saturated organic felt.

### **2.04 ACCESSORIES**

- A. Roofing Nails: Standard round wire shingle type, galvanized steel, stainless steel, aluminum roofing nails, or copper roofing nails, minimum 3/8 inch head diameter, 12 gage, 0.109 inch nail shank diameter, 1-1/2 inch long and complying with ASTM F1667.
- B. Plastic Cement: ASTM D4586/D4586M, asphalt roof cement.
- C. Plastic Ridge Vents: Extruded plastic with vent openings that do not permit direct water or weather entry; flanged to receive shingles.

### **2.05 METAL FLASHINGS**

- A. Metal Flashings: Provide sheet metal eave edge, gable edge, ridge, ridge vents, open valley flashing, chimney flashing, dormer flashing, and other flashing indicated.
- B. Sheet Metal: Galvanized steel, as specified in Section 07 6200.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.

### **3.02 PREPARATION**

- A. Seal roof deck joints wider than 1/16 inch as recommended by shingle manufacturer.

- B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.
- C. Broom clean deck surfaces before installing underlayment or eave protection.
- D. Install eave edge flashings tight with fascia boards, weather lap joints 2 inches and seal with plastic cement, and secure flange with nails spaced \_\_\_\_ inches on center.

### **3.03 INSTALLATION - EAVE PROTECTION MEMBRANE**

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

### **3.04 INSTALLATION - UNDERLAYMENT**

- A. Underlayment At Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches, stagger end laps of each consecutive layer, nail in place, and weather lap minimum 4 inches over eave protection.
- B. Weather lap and seal watertight with plastic cement any items projecting through or mounted on roof.

### **3.05 INSTALLATION - METAL FLASHING AND ACCESSORIES**

- A. Install flashings in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.
- C. Secure in place with nails at \_\_\_\_ inches on center, and conceal fastenings.
- D. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

### **3.06 INSTALLATION - SHINGLES**

- A. Install shingles in accordance with manufacturer's instructions manufacturer's instructions and NRCA (RM) applicable requirements.
  - 1. Fasten individual shingles using two nails per shingle, or as required by manufacturer and local building code, whichever is greater.
  - 2. Fasten strip shingles using four nails per strip, or as required by manufacturer and local building code, whichever is greater.
- B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area, and provide double course of shingles at eaves.
- C. Project first course of shingles 3/4 inch beyond fascia boards.
- D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.
- E. Complete installation to provide weather tight service.

### **3.07 PROTECTION**

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

**END OF SECTION**



## SECTION 07 5323

### ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING (EPDM)

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. EPDM membrane roofing system, including all components specified.
- B. Comply with the published recommendations and instructions of the roofing membrane manufacturer, at <http://manual.fsbp.com>.
- C. Commencement of work by Contractor shall constitute acknowledgement by Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

##### 1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood nailers associated with roofing and roof insulation.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Formed metal flashing and trim items associated with roofing.

##### 1.03 REFERENCE STANDARDS

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2016.
- B. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015.
- C. ASTM D4811/D4811M - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing; 2006 (Reapproved 2013)e1.
- D. FM 4470 - Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction; 2016.
- E. FM DS 1-28 - Wind Design; 2007.
- F. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2006.
- G. PS 1 - Structural Plywood; 2009.

##### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data:
  - 1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
- C. Samples: Submit samples of each product to be used.
- D. Executed Warranty.

##### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.
- B. Store materials clear of ground and moisture with weather protective covering.
- C. Keep combustible materials away from ignition sources.

## 1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.
- C. Warranty: Firestone Roofing Membrane Limited Warranty covering membrane only, for the term indicated.
  - 1. Limit of Liability: Prorated based on original cost of membrane.
  - 2. Scope of Coverage: Provide replacement membrane material sufficient to replace the affected area of membrane as a result of any manufacturing defect or ordinary exposure to the elements.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturer - Roofing System: Firestone Building Products LLC, Carmel, IN: [www.firestonebpco.com/#sle](http://www.firestonebpco.com/#sle).
  - 1. Roofing systems manufactured by others are acceptable provided the roofing system is completely equivalent in materials and warranty conditions and the manufacturer meets the following qualifications:
    - a. Specializing in manufacturing the roofing system to be provided.
- B. Manufacturer of Insulation and Cover Boards: Same manufacturer as roof membrane.

### 2.02 ROOFING SYSTEM DESCRIPTION

- A. Roofing System: Ethylene-propylene-diene-monomer (EPDM) single-ply membrane.
  - 1. Membrane Attachment: Fully adhered.
  - 2. Warranty: Full system warranty; Firestone 15 year Red Shield Limited Warranty covering membrane, roof insulation, and membrane accessories.
  - 3. Comply with applicable local building code requirements.
  - 4. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM DS 1-28 and FM DS 1-29, and meeting minimum requirements of FM 1-90 wind uplift rating.
- B. Roofing System Components: Listed in order from the top of the roof down:
  - 1. Membrane: Thickness as specified.
  - 2. Base Sheet Over Insulation: Mechanically attached.
  - 3. Insulation:
    - a. Maximum Board Thickness: 3 inches; use as many layers as necessary; stagger joints in adjacent layers.
    - b. Tapered: Slope as indicated; provide minimum R-value at thinnest point; place tapered layer on bottom.
    - c. Total R-value: 18, minimum.
    - d. Top Layer: Polyisocyanurate foam board, non-composite; mechanically fastened.
    - e. Bottom Layer: Polyisocyanurate foam board, non-composite; mechanically fastened.
    - f. Crickets: Tapered insulation of same type as specified for top layer; slope as indicated.

### 2.03 EPDM MEMBRANE MATERIALS

- A. Roofing and Flashing Membrane: Black, cured synthetic single-ply membrane composed of ethylene propylene diene monomer (EPDM) with the following properties:
  - 1. Reinforcement: None; membrane complying with ASTM D4637/D4637M Type I.
  - 2. Thickness: 0.060 inch.
  - 3. Nominal Thickness Tolerance: Plus/minus 10 percent.
  - 4. Sheet Width: Provide the widest available sheets to minimize field seaming.
  - 5. Acceptable Product: RubberGard Platinum EPDM Membrane by Firestone.

- B. Membrane Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.
- C. Flashing Membrane: Self-curing, non-reinforced membrane composed of nonvulcanized EPDM rubber, complying with ASTM D4811/D4811M Type II, and with the following properties:
  - 1. Thickness: 0.055 inch.
  - 2. Acceptable Product: RubberGard EPDM FormFlash by Firestone.
- D. Self-Adhesive Flashing Membrane: Semi-cured 45 mil EPDM membrane laminated to 35 mil EPDM tape adhesive; QuickSeam Flashing by Firestone.
- E. Pre-Molded Pipe Flashings: EPDM, molded for quick adaptation to different sized pipes; Firestone EPDM Pipe Flashing.
- F. Self-Adhesive Lap Splice Tape: 35 mil EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer; QuickSeam Splice Tape by Firestone.
- G. Splice Adhesive: Synthetic polymer-based, formulated for compatibility with EPDM membrane and metal surfaces; SA-1065 Splice Adhesive by Firestone.
- H. Adhesive Primer: Synthetic rubber based primer formulated for compatibility with EPDM membrane and tape adhesive, with VOC content less than 2.1 lb/gal; QuickPrime Plus LVOC by Firestone.
- I. Seam Edge Treatment: EPDM rubber-based sealant, formulated for sealing exposed edges of membrane at seams; Lap Sealant HS by Firestone.
- J. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.
- K. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal by Firestone.
- L. Metal Plates and Strips Used for Fastening Membrane and Insulation: Steel with Galvalume coating; corrosion-resistance meeting FM 4470 criteria.
- M. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches wide by 0.10 inch thick; Firestone Termination Bar by Firestone.

#### **2.04 ROOF INSULATION AND COVER BOARDS**

- A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C1289 Type II Class 1, with the following additional characteristics:
  - 1. Size: 48 inches by 96 inches, nominal.
    - a. Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches by 48 inches, nominal.
  - 2. R-value (LTTR):
    - a. 1.0 inch Thickness: 6.0, minimum.
    - b. 1.25 inch Thickness: 7.5, minimum.
    - c. 1.5 inch Thickness: 9.0, minimum.
    - d. 1.75 inch Thickness: 10.5, minimum.
    - e. 2.0 inch Thickness: 12.1, minimum.
    - f. 3.0 inch Thickness: 18.5, minimum.
    - g. 4.0 inch Thickness: 25.0, minimum.
  - 3. Compressive Strength: 20 psi when tested in accordance with ASTM C1289.
  - 4. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
  - 5. Recycled Content: 19 percent post-consumer and 15 percent pre-consumer (post-industrial), average.
- B. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

## 2.05 ACCESSORY MATERIALS

- A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.
  - 1. Width: 3-1/2 inches, nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.
  - 2. Thickness: Same as thickness of roof insulation.
- B. Concrete Pavers: Interlocking, with shiplap edges on all sides and integral radiused bearing pads.
  - 1. Size: Approximately 12 inches by 16 inches by 1-1/2 inches thick.
  - 2. Density: 125 pounds per cubic foot, nominal.
  - 3. Compressive Strength: 5000 psi, nominal.
  - 4. Water Absorption: 5 percent, nominal.

## PART 3 INSTALLATION

### 3.01 GENERAL

- A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.
- B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.
- C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.
- D. Perform work using competent and properly equipped personnel.
- E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
- F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F.
- G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
  - 1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
  - 2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
  - 3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
- H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.
- I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

### 3.02 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
- C. Examine roof substrate to verify that it is properly sloped to drains.

- D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

### **3.03 PREPARATION**

- A. Remove all of the existing roof system down to the roof deck including all existing composition base flashings. Dispose of all materials properly. Perform asbestos removal in accordance with federal, state and local regulations and dispose of waste in legal manner.
  - 1. At penetrations, remove all existing flashings, including lead, asphalt, mastic, etc.
  - 2. At walls, curbs, and other vertical and sloped surfaces, remove loose and unsecured flashings; remove mineral surfaced and coated flashings; remove excessive asphalt to provide a smooth, sound surface for new flashings.
- B. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.
- C. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.
- D. Fill all surface voids in the immediate substrate that are greater than 1/4 inch wide with fill material acceptable insulation to membrane manufacturer.
- E. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.

### **3.04 INSULATION AND COVER BOARD INSTALLATION**

- A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.
- B. Lay roof insulation in courses parallel to roof edges.
- C. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch. Fill gaps greater than 1/4 inch with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch.
- D. Mechanical Fastening: Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by Factory Mutual for FM Class specified in PART 2 and membrane manufacturer, whichever is more stringent.

### **3.05 SINGLE-PLY MEMBRANE INSTALLATION**

- A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
- B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.
- C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.
- D. Install membrane adhered to the substrate, with edge securement as specified.
- E. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.
- F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
  - 1. Exceptions: Round pipe penetrations less than 18 inches in diameter and square penetrations less than 4 inches square.
  - 2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

### **3.06 FLASHING AND ACCESSORIES INSTALLATION**

- A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.
- B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
  - 1. Follow roofing manufacturer's instructions.
  - 2. Remove protective plastic surface film immediately before installation.
  - 3. Install water block sealant under the membrane anchorage leg.
  - 4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
  - 5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
  - 6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
  - 7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.
- C. Roof Drains:
  - 1. Existing Drains: Remove all existing flashings, drain leads, roofing materials and cement from the drain; remove clamping ring.
  - 2. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
  - 3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
  - 4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
  - 5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

### **3.07 FINISHING AND WALKWAY INSTALLATION**

- A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
- B. Pavers: Install butted tightly, not more than 1/2 inch apart.

### **3.08 FIELD QUALITY CONTROL**

- A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).
- B. Perform all corrections necessary for issuance of warranty.

### **3.09 CLEANING**

- A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.
- B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.
- C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

### **3.10 PROTECTION**

- A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

**END OF SECTION**



**SECTION 07 6200**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and fascias and facing panels.
- B. Sealants for joints within sheet metal fabrications.
- C. Precast concrete splash pads.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 2000 - Unit Masonry: Metal flashings embedded in masonry.
- B. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.
- C. Section 06 1000 - Rough Carpentry: Wood blocking for batten seams.
- D. Section 07 3113 - Asphalt Shingles: Non-metallic flashings associated with shingle roofing.

**1.03 REFERENCE STANDARDS**

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

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples, 6 X 6 inch in size illustrating material of typical standing seam.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with \_\_\_\_\_ years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

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

**PART 2 PRODUCTS**

**2.01 SHEET MATERIALS**

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239 inch) thick base metal.
- B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
  - 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
  - 2. Color: As selected by Architect from manufacturer's standard colors.
- C. Aluminum: ASTM B209 (ASTM B209M); 20 gage, (0.032 inch) thick; anodized finish of color as selected.
  - 1. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mils thick.



- D. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 20 gage, (0.032 inch) thick; plain finish shop pre-coated with modified silicone coating.
  - 1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
  - 2. Color: As selected by Architect from manufacturer's standard colors.

## **2.02 GUTTER AND DOWNSPOUT FABRICATION**

- A. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- B. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.
- C. Downspout Boots: Steel.
- D. Seal metal joints.

## **2.03 ACCESSORIES**

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Concealed Sealants: Non-curing butyl sealant.
- D. Plastic Cement: ASTM D4586/D4586M, Type I.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

### **3.03 INSTALLATION**

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Secure gutters and downspouts in place with concealed fasteners.
- E. Connect downspouts to downspout boots, and grout connection watertight.
- F. Set splash pads under downspouts.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

**END OF SECTION**

**SECTION 07 8400  
FIRESTOPPING**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

**1.02 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
- B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.
- C. FM 4991 - Approval Standard for Firestop Contractors; 2013.
- D. FM (AG) - FM Approval Guide; current edition.
- E. UL (FRD) - Fire Resistance Directory; current edition.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Installer Qualification: Submit qualification statements for installing mechanics.

**1.04 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in UL (FRD) or FM (AG) will be considered as constituting an acceptable test report.
  - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at [www.icc-es.org](http://www.icc-es.org) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
  - 1. Trained by manufacturer.
  - 2. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
  - 3. Verification of minimum three years documented experience installing work of this type.
  - 4. Verification of at least five satisfactorily completed projects of comparable size and type.
  - 5. Licensed by local authorities having jurisdiction (AHJ).

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Manufacturers:
  - 1. A/D Fire Protection Systems Inc.; \_\_\_\_\_: [www.adfire.com](http://www.adfire.com).
  - 2. 3M Fire Protection Products; \_\_\_\_\_: [www.3m.com/firestop](http://www.3m.com/firestop).
  - 3. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
  - 4. Nelson FireStop Products; \_\_\_\_\_: [www.nelsonfirestop.com](http://www.nelsonfirestop.com).
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- C. Fire Ratings: Refer to drawings for required systems and ratings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

### **3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

### **3.04 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

### **3.05 PROTECTION**

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

**END OF SECTION**

**SECTION 07 9200  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

**1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
  - 3. Sample product warranty.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- D. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

**1.03 WARRANTY**

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

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
  - 1. BASF Construction Chemicals-Building Systems; \_\_\_\_\_: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
  - 2. Bostik Inc; \_\_\_\_\_: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  - 3. Dow Chemical Company; \_\_\_\_\_: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
  - 4. Pecora Corporation; \_\_\_\_\_: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 5. Tremco Global Sealants; \_\_\_\_\_: [www.tremcosealants.com](http://www.tremcosealants.com).
  - 6. Sherwin-Williams Company; \_\_\_\_\_: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - 7. Sika Corporation; \_\_\_\_\_: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
  - 8. Tremco Commercial Sealants & Waterproofing; \_\_\_\_\_: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  - 9. W.R. Meadows, Inc; \_\_\_\_\_: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - 10. \_\_\_\_\_.
- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
  - 1. BASF Construction Chemicals-Building Systems; \_\_\_\_\_: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
  - 2. Bostik Inc; \_\_\_\_\_: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  - 3. Dayton Superior Corporation; \_\_\_\_\_: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
  - 4. Dow Chemical Company; \_\_\_\_\_: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
  - 5. Pecora Corporation; \_\_\_\_\_: [www.pecora.com/#sle](http://www.pecora.com/#sle).

6. Tremco Global Sealants; \_\_\_\_\_: [www.tremcosealants.com](http://www.tremcosealants.com).
7. Sherwin-Williams Company; \_\_\_\_\_: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
8. Tremco Commercial Sealants & Waterproofing; \_\_\_\_\_: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
9. W.R. Meadows, Inc; \_\_\_\_\_: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
10. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
    - a. Wall expansion and control joints.
    - b. Joints between door, window, and other frames and adjacent construction.
    - c. Joints between different exposed materials.
    - d. Openings below ledge angles in masonry.
    - e. Other joints indicated below.
  2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door, window, and other frames and adjacent construction.
    - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
  3. Do not seal the following types of joints.
    - a. Intentional weepholes in masonry.
    - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    - d. Joints where installation of sealant is specified in another section.
- B. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

## 2.03 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 6116.
- B. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- C. Colors: As indicated on drawings.

## 2.04 SELF-LEVELING SEALANTS

- A. Type \_\_\_\_ - Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
  2. Hardness Range: 0 to 15, Shore A, when tested in accordance with ASTM C661.
  3. Color: To be selected by Architect from manufacturer's standard range.
  4. Service Temperature Range: Minus 40 to 180 degrees F.
  5. Manufacturers:
    - a. Sika Corporation; Sikasil 728RCS: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).

## 2.05 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
  2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  3. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
  - C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
  - D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
  - E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

#### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

#### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
  1. Width/depth ratio of 2:1.
  2. Neck dimension no greater than 1/3 of the joint width.
  3. Surface bond area on each side not less than 75 percent of joint width.
- F. Install bond breaker backing tape where backer rod cannot be used.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- H. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- I. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

J. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

**END OF SECTION**

**SECTION 08 1113**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Hollow metal borrowed lites glazing frames.
- F. Accessories, including glazing, louvers, and matching panels.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware.
- B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- C. Section 09 9113 - Exterior Painting: Field painting.
- D. Section 09 9123 - Interior Painting: Field painting.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- I. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- J. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- K. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- M. ITS (DIR) - Directory of Listed Products; current edition.
- N. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- O. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- P. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.



- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- S. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2016.
- T. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.
- U. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- V. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- W. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- X. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Y. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Qualification Statement.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  1. Curries, an Assa Abloy Group company; \_\_\_\_: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  2. Republic Doors; \_\_\_\_: [www.republicdoor.com](http://www.republicdoor.com).
  3. Steelcraft, an Allegion brand; \_\_\_\_: [www.allegion.com/#sle](http://www.allegion.com/#sle).
  4. Steelcraft: [www.steelcraft.com](http://www.steelcraft.com).

#### **2.02 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.

4. Door Edge Profile: Manufacturers standard for application indicated.
  5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
  6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
  7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
    - a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.
- B. Hollow Metal Panels: Same construction, performance, and finish as doors.
- C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### 2.03 HOLLOW METAL DOORS

- A. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
    - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
  2. Door Core Material: Polyurethane, 1.8 lbs/cu ft minimum density.
    - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
  3. Door Thermal Resistance: R-Value of 8.7, minimum, for installed thickness of polyurethane.
  4. Door Thickness: 1-3/4 inch, nominal.
  5. Door Face Sheets: Flush.
  6. Door Finish: Factory primed and field finished.
- B. Interior Doors, Non-Fire Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
  2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  3. Door Thickness: 1-3/4 inch, nominal.
  4. Door Face Sheets: Flush.
  5. Door Finish: Factory primed and field finished.
- C. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.

- d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
  - 2. Fire Rating: As indicated on drawings, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
  - 3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
  - 4. Provide units listed and labeled by UL (DIR).
    - a. Attach fire rating label to each fire rated unit.
  - 5. Smoke and Draft Control Doors (Indicated with letter "S" on Drawings and/or Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
    - a. Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
    - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
    - c. Label: Include the "S" label on fire-rating label of door.
  - 6. Door Thickness: 1-3/4 inch, nominal.
  - 7. Door Face Sheets: Flush.
  - 8. Door Finish: Factory primed and field finished.
- D. Sound-Rated Interior Doors:
- 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
  - 2. Sound Transmission Class (STC) Rating of Door and Frame Assembly: STC of 39, minimum, calculated in accordance with ASTM E413, and tested in accordance with ASTM E90.
  - 3. Door Core Material: Manufacturer's standard construction as required to meet acoustic requirements indicated.
  - 4. Door Thickness: As required to meet acoustic requirements indicated.
  - 5. Door Face Sheets: Flush.
  - 6. Door Finish: Factory primed and field finished.
  - 7. Sound Seals: Integral, in door and/or frame.
  - 8. Opening Force of Sound-Rated Doors, Non-Fire Rated: 5 lbs, maximum, in compliance with ADA Standards.

## 2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Exterior Door Frames: Full profile/continuously welded type.
  - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
  - 3. Weatherstripping: Separate, see Section 08 7100.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
  - 1. Frame Metal Thickness: 18 gage, 0.042 inch, minimum.
- E. Door Frames, Fire-Rated: Full profile/continuously welded type.
  - 1. Fire Rating: Same as door, labeled.
- F. Sound-Rated Door Frames: Knock-down type.
- G. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

- H. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- I. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.
- J. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

## **2.05 ACCESSORIES**

- A. Louvers: Roll formed steel with overlapping frame; finish same as door components; factory-installed.
  - 1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
  - 2. Style: Sightproof inverted Y blade.
  - 3. Louver Free Area: 50 percent.
  - 4. Fasteners: Exposed, tamper proof fasteners.
- B. Glazing: As specified in Section 08 8000, factory installed.
- C. Astragals for Double Doors: Specified in Section 08 7100.
  - 1. Exterior Doors: Steel, Z-shaped.
- D. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.
- E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

## **2.06 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 7100.
- F. Comply with glazing installation requirements of Section 08 8000.
- G. Coordinate installation of electrical connections to electrical hardware items.
- H. Touch up damaged factory finishes.

### **3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

### **3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.
- B. Adjust sound control doors so that seals are fully engaged when door is closed.

**END OF SECTION**

**SECTION 08 1416  
FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush wood doors; flush configuration; fire rated and non-rated.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.
- C. Section 09 9123 - Interior Painting: Field finishing of doors.
- D. Section 09 9300 - Staining and Transparent Finishing: Field finishing of doors.

**1.03 REFERENCE STANDARDS**

- A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- D. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.
- E. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- F. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- G. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Specimen warranty.
- E. Samples: Submit two samples of door veneer, \_\_4\_\_ by \_\_4\_\_ inch in size illustrating wood grain, stain color, and sheen.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Warranty, executed in Owner's name.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
- B. Installed Fire Rated Door and Transom Panel Assembly: Conform to 1 for fire-rating as indicated.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.

**1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
  - 1. Eggers Industries; \_\_\_\_: [www.eggersindustries.com/#sle](http://www.eggersindustries.com/#sle).
  - 2. Marshfield DoorSystems, Inc; \_\_\_\_: [www.marshfielddoors.com/#sle](http://www.marshfielddoors.com/#sle).
  - 3. Weyerhaeuser Company; [www.weyerhaeuser.com](http://www.weyerhaeuser.com).

### **2.02 DOORS AND PANELS**

- A. Doors: Refer to drawings for locations and additional requirements.
  - 1. Quality Level: Premium Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS).
  - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Exterior Doors: Flush solid core construction and water repellent treated.
  - 1. Thickness: 1-3/4 inches, unless otherwise indicated.
  - 2. Facing: Wood veneer for field transparent finish as indicated on drawings.
- C. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
  - 1. Provide solid core doors at each location.
  - 2. Fire Rated Doors: Tested to ratings as indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc. (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  - 3. Wood veneer facing for field transparent finish as indicated on drawings.
  - 4. Wood veneer facing for field opaque finish as indicated on drawings.
- D. Transom Panels: Same construction and finish as door; same performance rating as door.

### **2.03 DOOR AND PANEL CORES**

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

### **2.04 DOOR FACINGS**

- A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
  - 1. Vertical Edges: Any option allowed by quality standard for grade.
  - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
  - 3. Transoms: Continuous match to doors.
- B. Veneer Facing for Opaque Finish: Hardboard, in compliance with indicated quality standard.
- C. Facing Adhesive: Type I - waterproof.

### **2.05 ACCESSORIES**

- A. Hollow Metal Door Frames: As specified in Sections 08 1113 and 08 4313..
- B. Wood Louvers:
  - 1. Material and Finish: Match door species.
- C. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.
- D. Door Hardware: As specified in Section 08 7100.

## **2.06 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
- C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
  - 1. Exception: Doors to be field finished.
- F. Provide edge clearances in accordance with the quality standard specified.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Field-Finished Doors: Trimming to fit is acceptable.
  - 1. Adjust width of non-rated doors by cutting equally on both jamb edges.
  - 2. Trim maximum of 3/4 inch off bottom edges.
  - 3. Trim fire-rated doors in strict compliance with fire rating limitations.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.
- F. Install door louvers plumb and level.

### **3.03 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

### **3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**END OF SECTION**



**SECTION 08 4229  
AUTOMATIC ENTRANCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Packaged power-operated door assemblies of following types:
- B. Operators for doors provided in other sections.
- C. Controllers, actuators and safety devices.
- D. Maintenance.

**1.02 REFERENCE STANDARDS**

- A. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors; 2011.
- B. ITS (DIR) - Directory of Listed Products; current edition.
- C. NFPA 101 - Life Safety Code; 2015.
- D. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- E. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
  - 2. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Samples: Submit two samples of exposed to view hardware, carpet with frame, and attachment hardware.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.
- F. Maintenance Contract.
- G. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- H. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
- I. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than Ten years of documented experience, and a member of AAADM.

**1.05 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Door Operators for Swing Doors Specified in Other Sections:
  - 1. DORMA USA, Inc; ED100: [www.dorma.com/#sle](http://www.dorma.com/#sle).

2. Horton Automatics; \_\_\_\_\_: [www.hortondoors.com/#sle](http://www.hortondoors.com/#sle).
3. Stanley Access Technologies; Magic Access LE (Low Energy): [www.stanleyaccess.com/#sle](http://www.stanleyaccess.com/#sle).

## **2.02 POWER OPERATED DOORS**

- A. Power Operated Doors: Provide products that comply with NFPA 101 and requirements of authorities having jurisdiction; provide equipment selected for actual door weight and for light pedestrian traffic, unless otherwise indicated.
  1. Swinging Door Operators: Fully adjustable for opening and closing speeds, checking speeds, and hold-open time; in the event of power failure, disengage operator allowing door to function as a door with a spring closer.
  2. Exterior Swinging Doors: Provide equipment capable of operating, closing, and holding doors closed under positive and negative differential pressure; if necessary, provide power closing.
  3. Exterior and Vestibule Doors: Provide equipment suitable for operating temperature range of minus 20 to plus 140 degrees F ambient.
- B. Swinging Doors with Full Power Operators: Comply with BHMA A156.10; safeties required.
  1. Comply with UL 325; acceptable evidence of compliance includes UL (DIR) or ITS (DIR) listing or test report by testing agency acceptable to authorities having jurisdiction.
  2. Force Required to Set Door in Motion When Unpowered: 30 pound-force, maximum, measured at 1 inch from the latch edge of the door at any point in the closing cycle.

## **2.03 OPERATORS FOR SWINGING DOORS PROVIDED BY OTHERS**

- A. Door Operator: Electric, surface mounted overhead.
  1. Operation: Full-power open, spring close operation.
  2. Variable speed control for opening and closing cycles.
  3. Push-Side Actuator: Mat switch.
  4. Pull-Side Actuator: Mat switch.

## **2.04 CONTROLLERS, ACTUATORS, AND SAFETIES**

- A. Controller: Provide microprocessor operated controller for each door.
- B. Comply with BHMA A156.10 for actuator and safety types and zones.
- C. Proximity Detector Actuator/Safety: Microwave; distance of control sensitivity adjustable.
- D. Push Button Actuator: Standard momentary contact type, wall mounted, surface; stainless steel escutcheon plate.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and is of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install equipment in accordance with manufacturer's instructions.
- B. Provide for dimensional distortion of components during operation.
- C. Coordinate installation of components with related and adjacent work; level and plumb.

### **3.03 ADJUSTING**

- A. Adjust door equipment for correct function and smooth operation.

### **3.04 CLEANING**

- A. Remove temporary protection, clean exposed surfaces.

**3.05 CLOSEOUT ACTIVITIES**

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**3.06 MAINTENANCE**

- A. Provide a separate maintenance contract for specified maintenance service.
- B. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion, at no extra charge to Owner.

**END OF SECTION**

**SECTION 08 4313**  
**ALUMINUM-FRAMED STOREFRONTS**  
**ALUMINUM FRAMED WINDOWS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum framed windows.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 1416 Wood Doors

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- D. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 6 by 6 inches in size illustrating finished aluminum surface, glass, glazing materials.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## **PART 2 PRODUCTS**

### **2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING**

- A. Front-Set Style, Thermally-Broken Storefront:
  - 1. Basis of Design: YKK America: YES 45 TU
  - 2. Vertical Mullion Dimensions: 2 inches wide by 4 ½ inches deep.
- B. Front-Set Style, Thermally-Broken Window:
  - 1. Basis of Design: YKK America: YFW 400 TU
  - 2. Vertical Mullion Dimensions: 2 inches wide by 4 inches deep.

### **2.02 STOREFRONT**

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  - 1. Glazing Rabbet: For 1 inch insulating glazing.
  - 2. Finish: Superior performing organic coatings.
    - a. Factory finish all surfaces that will be exposed in completed assemblies.
    - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Finish Color: As selected by Architect from manufacturer's line;
    - a. Match Existing Medium/Dark Bronze Anodized Finish. Submit full range to Architect for final selection.
  - 4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
  - 5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
  - 6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
  - 7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
  - 8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
  - 9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements:
  - 1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
    - a. Design Wind Loads: Comply with requirements of ASCE 7.
    - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
  - 2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
  - 3. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
  - 4. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
  - 5. Overall U-value Including Glazing: \_\_\_\_\_ Btu/(hr sq ft deg F), maximum.

### **2.03 WINDOWS**

- A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.

1. Frame Depth: 4-1/2 inches.
2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
3. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
4. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

## **2.03 COMPONENTS**

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
  1. Glazing Stops: Flush.
- B. Swing Doors: Specified in 08 1416.
  1. Thickness: 1-3/4 inches.

## **2.04 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

## **2.05 FINISHES**

- A. Anodized Finishing: Prepare aluminum surfaces for specified finish; apply shop finish in accordance with the following:
  1. Anodic Coating: Electrolytic color coating followed by an organic seal applied in accordance with the requirements of AAMA 612.
  2. Aluminum extrusions shall be produced from quality controlled billets meeting AA-6063-T5.
    - a. Exposed Surfaces shall be free of scratches and other serious blemishes.
    - b. Extrusions shall be given a caustic etch followed by an anodic oxide treatment and then sealed with an organic coating applied with an electrodeposition process.
    - c. The anodized coating shall comply with all of the requirements of AAMA 612: Voluntary Specifications,
    - d. Overall coating thickness for finishes shall be a minimum of 0.7 mils.
  - 2) CASS Corrosion Resistance Test, CASS 240/ASTM B368 Test Method.
  - 3) Other AAMA 2605 Performance Tests specified in these specifications, such as: 7.3 Dry Film Hardness.

## **2.06 HARDWARE**

- A. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- B. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

### **3.02 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.

- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install hardware using templates provided.
- J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### **3.04 ADJUSTING**

- A. Adjust operating hardware and sash for smooth operation.

### **3.05 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.

### **3.06 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

**SECTION 08 7100  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for wood and hollow metal doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.

**1.02 REFERENCE STANDARDS**

- A. ITS (DIR) - Directory of Listed Products; current edition.
- B. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- C. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.
- D. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- E. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- C. Keying Requirements Owner's contractor will rekey cores at time of project close out.
  - 1. Keying to match existing building key system. Schlage. 'SC1' keyway.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
  - 1. Provide complete description for each door listed.
  - 2. Provide manufacturer's and product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
  - 1. Submit manufacturer's parts lists and templates.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.



## **PART 2 PRODUCTS**

### **2.01 DESIGN AND PERFORMANCE CRITERIA**

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
  - 3. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), testing firm acceptable to authorities having jurisdiction, or \_\_\_\_\_ as suitable for application indicated.

### **2.02 FINISHES**

- A. Finishes: Match existing hardware finish.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.

### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Use templates provided by hardware item manufacturer.
- D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
- E. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

### **3.03 ADJUSTING**

- A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

### **3.04 CLEANING**

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

### **3.05 PROTECTION**

- A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

**END OF SECTION**

## SECTION 08 8000

### GLAZING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds and accessories.

##### 1.02 RELATED REQUIREMENTS

- A. Section 08 4313 - Aluminum-Framed Storefronts Aluminum windows: Glazing furnished as part of storefront assembly.

##### 1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- C. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- D. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- E. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- F. GANA (SM) - GANA Sealant Manual; 2008.
- G. ITS (DIR) - Directory of Listed Products; current edition.
- H. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.
- I. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.
- J. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

##### 1.04 SUBMITTALS

- A. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- B. Samples: Submit two samples 12 by 12 inch in size of glass units.
- C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

##### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

##### 1.06 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.

##### 1.07 WARRANTY

- A. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- B. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Glass Fabricators:
- B. Float Glass Manufacturers:

1. AGC Glass North America, Inc; [www.agcglass.com/#sle](http://www.agcglass.com/#sle).
2. Cardinal Glass Industries; [www.cardinalcorp.com/#sle](http://www.cardinalcorp.com/#sle).
3. Guardian Glass, LLC; [www.guardianglass.com/#sle](http://www.guardianglass.com/#sle).
4. Pilkington North America Inc; [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).

## 2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
  1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  2. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  3. Glass thicknesses listed are minimum.
- B. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
  1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  3. Solar Optical Properties: Comply with NFRC 300 test method.

## 2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
  1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
  2. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category I criteria.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
  2. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum.

## 2.04 INSULATING GLASS UNITS

- A. Insulating Glass Units: Types as indicated.
  1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  3. Metal Edge Spacers: Aluminum, bent and soldered corners.
  4. Spacer Color: Black.
  5. Edge Seal:
    - a. Color: Black.
  6. Purge interpane space with dry air, hermetically sealed.
- B. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
  1. Applications: Exterior glazing unless otherwise indicated.
  2. Space between lites filled with argon.
  3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: Match Existing.
    - b. Coating: Low-E (passive type), on #2 surface.
  4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
  5. Total Thickness: 1 inch.
  6. Thermal Transmittance (U-Value), Summer - Center of Glass: .24, nominal.

7. Visible Light Transmittance (VLT): 54% percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): .28, nominal.

## **2.07 ACCESSORIES**

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

## **PART 3 EXECUTION**

### **3.01 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

### **3.02 PREPARATION**

- A. Clean contact surfaces with appropriate solvent and wipe dry immediately before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### **3.03 INSTALLATION, GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

### **3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### **3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)**

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

### **3.06 INSTALLATION - PRESSURE GLAZED SYSTEMS**

- A. Application - Exterior Glazed: Set glazing infills from exterior side of building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Install pressure plates without displacing glazing gasket; exert pressure for full continuous contact.
- D. Install cover plate.

### **3.07 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

### **3.08 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**

**SECTION 09 2116**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Acoustic insulation.
- E. Cementitious backing board.
- F. Gypsum wallboard.
- G. Joint treatment and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Building framing and sheathing.
- B. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire rated walls.
- D. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

**1.03 REFERENCE STANDARDS**

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).
- C. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014a.
- D. GA-216 - Application and Finishing of Gypsum Board; 2013.
- E. GA-600 - Fire Resistance Design Manual; 2015.
- F. UL (FRD) - Fire Resistance Directory; current edition.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

**PART 2 PRODUCTS**

**2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.

1. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

## 2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  1. ClarkDietrich Building Systems; \_\_\_\_: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  2. Phillips Manufacturing Company; \_\_\_\_: [www.phillipsmfg.com](http://www.phillipsmfg.com).
  3. Dietrich Metal Framing; [www.dietrichindustries.com](http://www.dietrichindustries.com).
  4. National Gypsum Company; [www.nationalgypsum.com](http://www.nationalgypsum.com).
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
  1. Studs: "C" shaped with flat or formed webs.
  2. Runners: U shaped, sized to match studs.
  3. Ceiling Channels: C-shaped.
  4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
  5. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
- C. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
  1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
  2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
  3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
  4. Deflection and Firestop Track:
    - a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
  5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.

## 2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
  1. CertainTeed Corporation; \_\_\_\_: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  2. Georgia-Pacific Gypsum; \_\_\_\_: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  3. National Gypsum Company; \_\_\_\_: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  4. USG Corporation; \_\_\_\_: [www.usg.com/#sle](http://www.usg.com/#sle).
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
    - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
  3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  4. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 5/8 inch.
  5. Mold Resistant Paper Faced Products:
    - a. American Gypsum Company; M-Bloc.

- b. Georgia-Pacific Gypsum; ToughRock Mold-Guard.
- c. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard.
- d. National Gypsum Company; Gold Bond XP Gypsum Board.
- 6. Glass Mat Faced Products:
  - a. Georgia-Pacific Gypsum; DensArmor Plus.
  - b. National Gypsum Company; Gold Bond eXP Interior Extreme Gypsum Panel.
  - c. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.
- C. Backing Board For Wet Areas: One of the following products:
  - 1. Application: Surfaces behind tile in wet areas including exterior soffits and ceilings..
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
    - a. Thickness: 1/2 inch.
    - b. Products:
      - 1) National Gypsum Company; PermaBase Cement Board:  
www.nationalgypsum.com/#sle.
      - 2) USG Corporation; \_\_\_\_\_: www.usg.com/#sle.

#### **2.04 GYPSUM WALLBOARD ACCESSORIES**

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 2 inch.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
  - 1. Types: As detailed or required for finished appearance.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
  - 1. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
  - 2. Ready-mixed vinyl-based joint compound.
- E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- F. Nails for Attachment to Wood Members: ASTM C514.
- G. Adhesive for Attachment to Wood, ASTM C557 and Metal:
  - 1. Products:
    - a. Franklin International, Inc; Titebond PROvantage Professional Drywall Adhesive:  
www.titebond.com/#sle.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **3.02 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
  - 1. Level ceiling system to a tolerance of 1/600.
  - 2. Laterally brace entire suspension system.
  - 3. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs as indicated.
  - 1. Extend partition framing to structure where indicated and to ceiling in other locations.



2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
  3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
  - E. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
  - F. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.
  - G. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.
  - H. Blocking: Install wood blocking for support of:
    1. Framed openings.
    2. Wall mounted door hardware.

### **3.03 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
- F. Cementitious Backing Board: Install over steel framing members and wood framing members where indicated, in accordance with ANSI A108.11-SystemDeleted and manufacturer's instructions.
- G. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:
  1. Single-Layer Applications: Adhesive application.

### **3.04 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
  1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### **3.05 JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.

- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

**3.06 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**END OF SECTION**

**SECTION 09 5100  
ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Acoustical units.

**1.02 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 12 by 12 inch in size illustrating material and finish of acoustical units.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

**1.04 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Acoustic Tiles/Panels:
  - 1. Armstrong World Industries, Inc; \_\_\_\_: [www.armstrong.com/#sle](http://www.armstrong.com/#sle).
  - 2. No substitutions permitted.
- B. Suspension Systems:
  - 1. Same as for acoustical units.
  - 2. No substitutions permitted.

**2.02 ACOUSTICAL UNITS**

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels Type \_\_\_\_:
  - 1. Size: 24 by 24 inches.
  - 2. Light Reflectance: \_\_\_\_ percent, determined in accordance with ASTM E1264.
  - 3. NRC Range: \_\_\_\_ to \_\_\_\_, determined in accordance with ASTM E1264.
  - 4. Articulation Class: \_\_\_\_, determined in accordance with ASTM E1264.
  - 5. Ceiling Attenuation Class (CAC): \_\_\_\_, determined in accordance with ASTM E1264.
  - 6. Panel Edge: Angles Tegular.
  - 7. Surface Pattern: Perforated.
  - 8. Surface Color: White.
  - 9. Products:
    - a. Armstrong Cirrus 584B.
    - b. Match existing ceiling tile profile and finish

**2.03 SUSPENSION SYSTEM(S)**

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; intermediate-duty.

1. Profile: Tee; 15/16 inch wide face.
2. Construction: Double web.
3. Finish: White painted.
4. Products:
  - a. Match existing grid system.

#### **2.04 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
  1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

#### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.
- H. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  1. Use longest practical lengths.
  2. Overlap and rivet corners.

#### **3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  1. Make field cut edges of same profile as factory edges.

#### **3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

**SECTION 09 5423**  
**LINEAR METAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system and perimeter trim.
- B. Linear, formed metal ceiling panels.

**1.02 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2010.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- G. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2009a.
- H. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2008.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure linear metal panels are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Design components to ensure light fixtures will not induce eccentric loads. Where components may induce rotation of ceiling system components, provide stabilizing reinforcement.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components and linear metal panel units.
- C. Samples: Submit two full size samples illustrating material and finish.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Linear Metal Panels: Quantity equal 5 of length installed.

**1.05 FIELD CONDITIONS**

- A. Maintain area free of debris and construction material prior to, during, and after unit installation.

**1.06 QUALITY ASSURANCE**

- A. Designer Qualifications for Seismic Design: Under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc..

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Accept factory-finished products on site in manufacturer's unopened factory packaging only; reject opened packages.
- B. Protect factory-finished products from damage to appearance by storing products in manufacturer's unopened factory packaging in dry storage area.

### **1.08 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty; include coverage for corrosion resistance and discoloration of surface finish.

## **PART 2 PRODUCTS**

### **2.01 BASIS OF DESIGN**

- A. USG; Pralines Baffles Linear Metal Ceiling: [www.usg.com](http://www.usg.com).

### **2.02 LINEAR METAL CEILING**

- A. Linear Metal Ceiling and Soffit System: Panels, suspension members, trim and accessories as required to provide a complete system.
- B. Performance Requirements:
  1. Design to support imposed loads of indicated items without eccentric loading of supports.
  2. Design for maximum deflection of 1/360 of span.
  3. Design to resist seismic load by using practices specified in ASTM E580.
  4. Systems Located Outside Building Envelope:
    - a. Accommodate wind and suction loads and wind uplift without damage in accordance with applicable code.
    - b. Accommodate wind and suction loads and wind uplift to resist \_\_\_\_ psf (\_\_\_\_ kPa) without damage.
    - c. Thermal Resistance Value: Total R-value of \_\_\_\_ (\_\_\_\_ with insulation installed).

### **2.03 COMPONENTS**

- A. USG Corporation, "Paraline Baffles".
  1. Provide ceiling panels complying with ASTM E 1264 for type, form and pattern as follows:
    - a. Type: VII, Perforated aluminum facing (baffle) with mineral glass or fiber base backing.
    - b. Pattern: Perforated round holes in a straight
  2. Pan Face Finish painted in color to match manufacturer's full range: Submit full range of samples for selection by Architect.
  3. LR: Not less than 0.9 with Matte White 3708 (without perforations).
  4. Acoustical Backer: Acoustibond.
  5. CAC: Not less than N/A.
  6. Edge Detail: N/A
  7. Baffle Thickness: 1 1/2 in (38 mm).
  8. Baffle Height: 4 in (102 mm).
  9. Baffle Length: 144 in (3658 mm)].
  10. Recycled Content:
  11. Panel Warranty: 1-year USG Specialty Systems Warranty, reference USG SC2102

- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
  - 1. Symmetrical carriers: 12 ft. aluminum carriers used in exterior applications to hold the Paraline II pans.
  - 2. Expansion carriers are 4 ft. symmetrical carriers used at the end of standard symmetrical carriers to increase the space between the pans by 1/8 in. to allow for the use of full pans at the perimeter.
  - 3. Contraction carriers are 4 ft. symmetrical carriers used at the end of standard symmetrical carriers to decrease the space between the pans by 3/32 in. to allow for the use of full pans at the perimeter.
  - 4. Symmetrical carrier splices are 6 in. splices used at two abutting ends of symmetrical carriers to reinforce the joint.
  - 5. U-2-3/32 moldings are 12 ft. aluminum wall moldings used at the perimeter of the Paraline II system.
- C. Accessories
  - 1. Hanger reinforcement clips are 2 in. clips used at each hanger wire location.
  - 2. U-2-3/32 hold-down clips are used at the perimeter to hold the pans flat in the U-molding.
  - 3. Paraline II splice plates are used to connect two abutting Paraline II pans to reinforce the joint.
  - 4. 90-degree Paraline II splice plates are used to connect two intersecting Paraline II pans to reinforce a 90-degree corner.
  - 5. Paraline II end plugs are used to finish the ends of Paraline II pans.
  - 6. Compression post adapters are used with 3/4 in. conduit (by others) to attach the conduit to the symmetrical carriers.
  - 7. 12-gauge hanger wires are a common building product used to suspend acoustical, drywall, and specialty ceilings. They are galvanized for corrosion resistance.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of carriers will not interfere with other work.

### **3.02 INSTALLATION - SUSPENSION COMPONENTS**

- A. Install suspension components in accordance with manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Locate system on room/space axis according to reflected plan.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Where ducts or other equipment prevent the regular spacing of carriers, reinforce the nearest affected carrier and related carrying channels to span the extra distance.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of carriers.
- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Overlap and rivet corners.

### **3.03 INSTALLATION – LINEAR PANELS**

- A. Install linear panels and other system components in accordance with manufacturer's instructions.
- B. Stagger end joints minimum 12 inches (300 mm).
- C. Align end joints.
- D. Butt interior end joints tight.
- E. Set exterior end joints with 1/16 inch (2 mm) gap for expansion and contraction.
- F. Provide expansion joints to accommodate plus or minus 1 inch (25 mm) movement and maintain visual closure.
- G. Field miter corners at changes in panel direction.
- H. Install space closures between linear panels at interior locations.
- I. Install edge moldings at junctions with other finishes and at vertical surfaces; use maximum piece lengths.
- J. Where bullnose masonry units occur, install radiused closures to fit edge molding.
- K. Install end caps at sight-exposed ends of linear panels.
- L. Exercise care when site cutting sight-exposed finished components to ensure surface finish is not defaced.

### **3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**



**SECTION 09 6813  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.

**1.02 REFERENCE STANDARDS**

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2015.
- C. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and \_\_\_\_\_.
- F. Concrete Sub-floor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

**1.04 FIELD CONDITIONS**

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Tile Carpeting:
  - 1. Shaw contract: [www.shawcontract.com](http://www.shawcontract.com)
  - 2. No substitutions

**2.02 MATERIALS**

- A. Tile Carpeting: Tufted, manufactured in one color dye lot.
  - 1. Product: Bright Work manufactured by Shaw contract.
  - 2. Tile Size: 24 by 24 inch, nominal.
  - 3. Thickness: 0.116 inch.
  - 4. Color: As selected from full range of colors.
  - 5. Pattern: Glimmer.
  - 6. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  - 7. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").

- B. Tile Carpeting: Tufted, manufactured in one color dye lot.
  - 1. Product: Steppin Out manufactured by Shaw contract.
  - 2. Tile Size: 24 by 24 inch, nominal.
  - 3. Thickness: 0.362 inch.
  - 4. Color: As selected from full range of colors.
  - 5. Pattern: Welcome II.
  - 6. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  - 7. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").

## **2.03 ACCESSORIES**

- A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Edge Strips: Embossed aluminum, color.
- C. Adhesives:
- D. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. For varying thickness of carpet at butt installation apply latex flooring compound tapered to zero change to install carpet flush.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Fully adhere carpet tile to substrate.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

### **3.04 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**

**SECTION 09 9123  
INTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Materials for backpriming woodwork.
- D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
  - 1. Prime surfaces to receive wall coverings.
  - 2. Mechanical and Electrical:
    - a. In finished areas, paint shop-primed items.
    - b. Paint interior surfaces of air ducts and convactor and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
    - c. Paint dampers exposed behind louvers, grilles, and convactor and baseboard cabinets to match face panels.
- E. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
  - 6. Marble, granite, slate, and other natural stones.
  - 7. Floors, unless specifically indicated.
  - 8. Ceramic and other tiles.
  - 9. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
  - 10. Glass.
  - 11. Concrete masonry units in utility, mechanical, and electrical spaces.
  - 12. Acoustical materials, unless specifically indicated.
  - 13. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 5000 - Metal Fabrications: Shop-primed items.
- B. Section 32 1723.13 - Painted Pavement Markings: Painted pavement markings.

**1.03 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.

2. Where sheen is not specified, submit each color in each sheen available.
  3. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
  4. Allow 30 days for approval process, after receipt of complete samples by Architect.
  5. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
  2. Label each container with color in addition to the manufacturer's label.

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

### **1.07 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Provide paints and finishes from the same manufacturer to the greatest extent possible.
1. Substitution of other products by the same manufacturer is preferred over substitution of products by a different manufacturer.
  2. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.

- C. Paints:
  1. Base Manufacturer: Sherwin-Williams Compant; [www.sherwin-williams.com](http://www.sherwin-williams.com).
  2. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com).
  3. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
- D. Transparent Finishes:
  1. Base Manufacturer: Sherwin-Williams Company; [www.sherwin-williams.com](http://www.sherwin-williams.com).
  2. PPG Paints Deft Interior Clears/Polyurethanes: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  3. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com)
- E. Stains:
  1. Base Manufacturer: Sherwin-Williams Company; [www.sherwin-williams.com](http://www.sherwin-williams.com).
  2. PPG Paints Deft Interior Stains: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  3. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com)
- F. Primer Sealers: Same manufacturer as top coats.

## 2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
  1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at [www.paintinfo.com](http://www.paintinfo.com), for specified MPI categories, except as otherwise indicated.
  2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
  5. Supply each paint material in quantity required to complete entire project's work from a single production run.
  6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.
- C. Volatile Organic Compound (VOC) Content:
  1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - b. SCAQMD 1113 Rule.
    - c. CARB (SCM).
    - d. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; [www.otcair.org](http://www.otcair.org); specifically:
      - 1) Opaque, Flat: 50 g/L, maximum.
      - 2) Opaque, Nonflat: 150 g/L, maximum.
      - 3) Opaque, High Gloss: 250 g/L, maximum.
      - 4) Varnishes: 350 g/L, maximum.
    - e. Architectural coatings VOC limits of the State of Ohio.
  2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Flammability: Comply with applicable code for surface burning characteristics.
- E. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

- F. Colors: To be selected from manufacturer's full range of available colors.
  - 1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
  - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

### 2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
  - 1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
  - 2. Two top coats and one coat primer.
  - 3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Waterbased Catalyzed Epoxy, Gloss. (MPI #115)
      - 2) Sherwin-Williams Waterbased Catalyzed Epoxy, Semi-Gloss.
      - 3) Substitutions: Section 01 6000 - Product Requirements.
  - 4. Top Coat(s): High Performance Architectural Interior Latex; MPI #139, 140, or 141.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #139)
      - 2) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #141)
      - 3) Substitutions: Section 01 6000 - Product Requirements.
  - 5. Top Coat(s): Interior Light Industrial Coating, Water Based; MPI #151, 153 or 154.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Acrylic Coating, Semi-Gloss. (MPI #153)
      - 2) Sherwin-Williams Pro Industrial Acrylic Coating, Gloss. (MPI #154)
      - 3) Substitutions: Section 01 6000 - Product Requirements.
  - 6. Top Coat(s): Interior Alkyd, Water Based; MPI #167, 168, or 169.
    - a. Products:
      - 1) Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd, Eg-Shel.
      - 2) Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd, Gloss.
      - 3) Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd, Semi-Gloss.
      - 4) Substitutions: Section 01 6000 - Product Requirements.
  - 7. Top Coat Sheen:
    - a. Eggshell: MPI gloss level 3; use this sheen at all locations.
    - b. Satin: MPI gloss level 4; use this sheen at all locations.
    - c. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
    - d. Gloss: MPI gloss level 6; use this sheen at all locations.
    - e. Substitutions: Section 01 6000 - Product Requirements.
  - 8. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint I-OP-MD-WC - Medium Duty Vertical and Overhead: Including gypsum board, plaster, concrete, concrete masonry units, uncoated steel, shop primed steel, galvanized steel, and aluminum.
  - 1. Two top coats and one coat primer.
  - 2. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Waterbased Catalyzed Epoxy, Gloss. (MPI #115)
      - 2) Sherwin-Williams Waterbased Catalyzed Epoxy, Gloss.
      - 3) Sherwin-Williams Waterbased Catalyzed Epoxy, Semi-Gloss.
      - 4) Substitutions: Section 01 6000 - Product Requirements.

3. Top Coat(s): Institutional Low Odor/VOC Interior Latex; MPI #143, 144, 145, 146, 147, or 148.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Acrylic Coating, Eg-Shel.
      - 2) Sherwin-Williams Pro Industrial Acrylic Coating, Gloss. (MPI #148)
      - 3) Sherwin-Williams Pro Industrial Acrylic Coating, Semi-Gloss. (MPI #147)
      - 4) Sherwin-Williams Harmony Interior Acrylic Latex, Eg-Shel. (MPI #144)
      - 5) Sherwin-Williams Harmony Interior Acrylic Latex, Flat. (MPI #143)
      - 6) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat.
      - 7) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Low Sheen. (MPI #144)
      - 8) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss.
      - 9) Substitutions: Section 01 6000 - Product Requirements.
  4. Top Coat(s): Interior Light Industrial Coating, Water Based; MPI #151, 153, or 154.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Acrylic Coating, Eg-Shel.
      - 2) Sherwin-Williams Pro Industrial Acrylic Coating, Gloss. (MPI #154)
      - 3) Sherwin-Williams Pro Industrial Acrylic Coating, Semi-Gloss. (MPI #153)
      - 4) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #151)
      - 5) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #153)
      - 6) Substitutions: Section 01 6000 - Product Requirements.
  5. Top Coat(s): Interior Alkyd, Water Based; MPI #167, 168, or 169.
    - a. Products:
      - 1) Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd, Eg-Shel.
      - 2) Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd, Gloss.
      - 3) Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd, Semi-Gloss.
      - 4) Substitutions: Section 01 6000 - Product Requirements.
- C. Paint I-OP-FL - Concrete and Wood Floors to be Painted.
1. Two top coats and one coat primer.
  2. Top Coat(s): Alkyd Floor Enamel, Gloss; MPI #27.
    - a. Products:
      - 1) \_\_\_\_\_
      - 2) \_\_\_\_\_
  3. Top Coat(s): Latex Floor Paint, Low Gloss; MPI #60.
    - a. Products:
      - 1) Sherwin-Williams Porch and Floor Enamel.
      - 2) Sherwin-Williams Tread-Plex Acrylic Floor Coating. (MPI #60)
      - 3) Substitutions: Section 01 6000 - Product Requirements.
  4. Top Coat Sheen:
    - a. Eggshell: MPI gloss level 3; use this sheen at all locations.
    - b. Satin: MPI gloss level 4; use this sheen at all locations.
    - c. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
    - d. Gloss: MPI gloss level 6; use this sheen at all locations.
  5. Primer: As recommended by top coat manufacturer for specific substrate.
- D. Paint I-TR -W - Transparent Finish on Wood.
1. Two coats MPI Danish Oil (MPI # 92).
  2. 1 top coat over sanding sealer over stain.
  3. Stain: Semi-Transparent Stain for Wood; MPI #90.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics 250 VOC Oil Stain. (MPI #90)
      - 2) Sherwin-Williams Wood Classics Interior Oil Stain. (MPI #90)
      - 3) Substitutions: Section 01 6000 - Product Requirements.

4. Sealer: Alkyd, Sanding Sealer, Clear; MPI #102.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics FastDry Sanding Sealer. (MPI #102)
      - 2) Substitutions: Section 01 6000 - Product Requirements.
  5. Sealer: Lacquer, Sanding Sealer, White; MPI #24.
    - a. Products:
      - 1) Substitutions: Section 01 6000 - Product Requirements.
  6. Top Coat(s): Polyurethane Varnish, Oil Modified; MPI #56 or 57.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics Polyurethane Varnish, Satin. (MPI #57)
      - 2) Substitutions: Section 01 6000 - Product Requirements.
  7. Top Coat(s): Polyurethane Varnish, High Build.
    - a. Products:
      - 1) Sherwin-Williams MinWax High Build Polyurethane, Gloss.
      - 2) Sherwin-Williams MinWax High Build Polyurethane, Satin.
      - 3) Sherwin-Williams MinWax High Build Polyurethane, Semi-Gloss.
      - 4) Substitutions: Section 01 6000 - Product Requirements.
  8. Top Coat(s): Alkyd Varnish; MPI #73 or 75
  9. Top Coat(s): Clear Water Based Varnish; MPI #128, 129, or 130.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics Waterborne Polyurethane Varnish, Gloss. (MPI #130)
      - 2) Sherwin-Williams Wood Classics Waterborne Polyurethane Varnish, Satin.
      - 3) Substitutions: Section 01 6000 - Product Requirements.
  10. Top Coat(s): Top Coat for Multicolored Coating, Clear; MPI #121.
    - a. Products:
      - 1) Substitutions: Section 01 6000 - Product Requirements.
  11. Top Coat Sheen:
    - a. Flat: MPI gloss level 1; use this sheen at all locations.
    - b. Eggshell: MPI gloss level 3; use this sheen at all locations.
    - c. Satin: MPI gloss level 4; use this sheen at all locations.
    - d. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
    - e. Gloss: MPI gloss level 6; use this sheen at all locations.
    - f. High Gloss: MPI gloss level 7; use this sheen at all locations.
- E. Paint I-TR-FL - Transparent Finish on Wood Floors:
1. 2 top coats over stain.
  2. Stain: Semi-Transparent Stain for Wood; MPI #90.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics 250 VOC Oil Stain. (MPI #90)
      - 2) Sherwin-Williams MinWax 250 VOC Oil Stain. (MPI #90)
      - 3) Sherwin-Williams Wood Classics Interior Oil Stain. (MPI #90)
      - 4) Substitutions: Section 01 6000 - Product Requirements.
  3. Top Coat(s): Polyurethane Varnish, Oil Modified; MPI #56 or 57.
    - a. Products:
      - 1) PPG Paints Defthane Interior/Exterior Polyurethane Oil-Based Gloss 275, DFT 21. (MPI #56)
      - 2) PPG Paints Defthane Interior/Exterior Polyurethane Oil-Based Satin 275, DFT 26 (MPI #57)
      - 3) PPG Paints Defthane Interior/Exterior Polyurethane Oil-Based Semi-Gloss 275, DFT 123 (MPI #57)
      - 4) Sherwin-Williams Wood Classics Polyurethane Varnish, Gloss. (MPI #56)
      - 5) \_\_\_\_\_.
      - 6) \_\_\_\_\_.



4. Top Coat(s): Polyurethane Varnish, High Build.
  - a. Products:
    - 1) Sherwin-Williams MinWax High Build Polyurethane, Gloss.
    - 2) Sherwin-Williams MinWax High Build Polyurethane, Satin.
    - 3) Sherwin-Williams MinWax High Build Polyurethane, Semi-Gloss.
    - 4) Substitutions: Section 01 6000 - Product Requirements.
5. Top Coat Sheen:
  - a. Satin: MPI gloss level 4; use this sheen at all locations.
  - b. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
  - c. Gloss: MPI gloss level 6; use this sheen at all locations.

#### **2.04 PRIMERS**

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
  1. Interior Latex Primer Sealer; MPI #50.
  2. Interior Drywall Primer Sealer.
  3. Interior/Exterior Quick Dry Alkyd Primer for Metal; MPI #76.
  4. Interior Water Based Primer for Galvanized Metal; MPI #134.
  5. Alkyd Primer for Galvanized Metal.
  6. Latex Primer for Interior Wood; MPI #39.

#### **2.05 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  1. Gypsum Wallboard: 12 percent.
  2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- I. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- J. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with tinted primer.
- K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.05 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

### **3.06 SCHEDULE - PAINT SYSTEMS**

- A. Gypsum Board: Finish surfaces exposed to view.
  - 1. Interior Ceilings and Bulkheads: GI-OP-3L, flat.
  - 2. Interior Walls: GI-OP-3A, semi-gloss.
- B. Plaster: Finish surfaces exposed to view, except \_\_\_\_\_.
  - 1. Interior Walls and Ceilings: GI-OP-2LA.
- C. Wood: Finish surfaces exposed to view.
  - 1. Interior trim and frames: WI-OP-3A, semi-gloss.

- D. Wood Doors: WI-TR-VS.
- E. Steel Doors and Frames: Finish surfaces exposed to view; MI-OP-3A, gloss.
- F. Steel Fabrications: Finish surfaces exposed to view.
  - 1. Interior: MI-OP-3L, gloss.
- G. Galvanized Steel: Finish surfaces exposed to view.
  - 1. Interior: Mgl-OP-3L.
- H. Shop-Primed Metal Items: Finish surfaces exposed to view, except \_\_\_\_\_.
  - 1. Interior: MI-OP-2A.
- I. Wall Surfaces Under Vinyl Wall Covering: GI-P-1A.

**END OF SECTION**

**SECTION 10 1400**  
**SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Room and door signs.

**1.02 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. Submit for approval by Owner through Architect prior to fabrication.
- D. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

**1.05 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Flat Signs:
  - 1. Cosco Industries (ADA signs); ADA Series 1: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
  - 2. FASTSIGNS; \_\_\_\_\_: [www.fastsigns.com/#sle](http://www.fastsigns.com/#sle).

**2.02 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 \_\_\_\_\_, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
  - 1. Sign Type: Flat signs with engraved panel media as specified.
  - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  - 3. Character Height: 1 inch.

**2.03 SIGN TYPES**

- A. Flat Signs: Signage media without frame.
  - 1. Edges: Bevelled.
  - 2. Corners: Radiused.
  - 3. Wall Mounting of One-Sided Signs: Tape adhesive.

- B. Color and Font: Unless otherwise indicated:
  - 1. Character Font: Helvetica, Arial, or other sans serif font.
  - 2. Character Case: Upper case only.
  - 3. Background Color: Clear.
  - 4. Character Color: Contrasting color.

**2.04 TACTILE SIGNAGE MEDIA**

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
  - 1. Total Thickness: 1/16 inch.

**2.05 ACCESSORIES**

- A. Tape Adhesive: Double sided tape, permanent adhesive.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until Substantial Completion; repair or replace damaged items.

**END OF SECTION**

**SECTION 31 2200**  
**GRADING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rough grading the site for site structures.
- B. Finish grading.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 2316 - Excavation.

**1.03 SUBMITTALS**

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Topsoil: Conforming to State of Ohio, Highway Department standards.
- B. Topsoil: Topsoil excavated on-site.
  - 1. Graded.
  - 2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Notify utility company to remove and relocate utilities.
- D. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- G. Protect plants and lawns to remain as a portion of final landscaping.

**3.03 ROUGH GRADING**

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.
- G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

- H. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

### **3.04 FINISH GRADING**

- A. Before Finish Grading:
  - 1. Verify building and trench backfilling have been inspected.
  - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- D. Place topsoil in areas where seeding are indicated.
- E. Place topsoil to the following compacted thicknesses:
  - 1. Areas to be Seeded with Grass: 6 inches.
  - 2. Areas to be Sodded: 4 inches.
  - 3. Shrub Beds: 18 inches.
- F. Place topsoil during dry weather.
- G. Remove roots, weeds, rocks, and foreign material while spreading.
- H. Near plants spread topsoil manually to prevent damage.
- I. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- J. Lightly compact placed topsoil.
- K. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

### **3.05 REPAIR AND RESTORATION**

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

### **3.06 FIELD QUALITY CONTROL**

- A. See Section 31 2323 for compaction density testing.

**END OF SECTION**

**SECTION 31 2316  
EXCAVATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating for building volume below grade, footings, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Trenching for utilities outside the building to utility main connections.
- C. Temporary excavation support and protection systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring. General requirements for dewatering of excavations and water control.
- B. Section 31 2200 - Grading: Soil removal from surface of site.
- C. Section 31 2323 - Fill: Fill materials, backfilling, and compacting.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

**1.04 SUBMITTALS**

- A. Project Record Documents: Record drawings at project closeout according to 01 7000 - Execution and Closeout Requirements. Show locations of installed support materials left in place, including referenced locations and depths, on drawings.
- B. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

**1.05 QUALITY ASSURANCE**

- A. Temporary Support and Excavation Protection Plan:
  - 1. Indicate sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Bedding and Fill to Correct Over-Excavation:
  - 1. See Section 31 2323 for bedding and corrective fill materials at general excavations.
  - 2. See Section 31 2316.13 for bedding and corrective fill materials at utility trenches.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.
- C. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by Architect. If the proposed excavation extends more than 1 foot into the prevailing groundwater, control groundwater intrusion with a comprehensive dewatering procedures, or as directed by Geotechnical Engineer.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.



- C. Notify utility company to remove and relocate utilities.
- D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Protect plants and lawns to remain.
- F. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

**3.03 TEMPORARY EXCAVATION SUPPORT AND PROTECTION**

- A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

**3.04 EXCAVATING**

- A. Excavate to accommodate new structures and construction operations.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

**3.05 FILLING AND BACKFILLING**

- A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.

**3.06 REPAIR**

- A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

**3.07 FIELD QUALITY CONTROL**

- A. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

**3.08 PROTECTION**

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

**END OF SECTION**

## SECTION 31 2323

### FILL

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for building volume below grade.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.
- D. Lightweight concrete fill.

##### 1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 31 2200 - Grading: Removal and handling of soil to be re-used.
- C. Section 31 2200 - Grading: Site grading.
- D. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.
- E. Section 32 1423 - Asphalt Unit Paving: Leveling bed placement under pavers.

##### 1.03 REFERENCE STANDARDS

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; 1965 (2012).
- B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2015.
- C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)); 2012.
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2012.
- E. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2015.

##### 1.04 SUBMITTALS

- A. Materials Sources: Submit name of imported materials source.
- B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- C. Compaction Density Test Reports.

##### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.

#### PART 2 PRODUCTS

##### 2.01 FILL MATERIALS

- A. Granular Fill - Gravel : AASHTO M 147, Grade \_\_\_\_; passing the No. \_\_\_\_ sieve; with a liquid limit of not more than 25 and a plasticity index of not more than 5 in accordance with ASTM D4318.
- B. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter.
- C. Topsoil: See Section 31 2200.

- D. Topsoil: Topsoil excavated on-site.
  - 1. Graded.
  - 2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
  - 3. Acidity range (pH) of 5.5 to 7.5.
  - 4. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
- E. Engineered Fill - Lightweight Concrete:
  - 1. Materials:
    - a. Cement: ASTM C150/C150M.
    - b. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
    - c. Expansion Material: Manufacturer's recommended expansion material.
    - d. Mix Design: By manufacturer.

## **2.02 ACCESSORIES**

- A. Geotextile Fabric: Non-biodegradable, woven, manufactured by \_\_\_\_\_.

## **2.03 SOURCE QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- D. Verify structural ability of unsupported walls to support imposed loads by the fill.
- E. Verify areas to be filled are not compromised with surface or ground water.

### **3.02 PREPARATION**

- A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### **3.03 FILLING**

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
  - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated:
  - 1. Under paving, slabs-on-grade, and similar construction: 97 percent of maximum dry density.
  - 2. At other locations: 95 percent of maximum dry density.

- H. Reshape and re-compact fills subjected to vehicular traffic.
- I. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

**3.04 ENGINEERED FILL - LIGHTWEIGHT CONCRETE**

- A. Install lightweight concrete fill according to manufacturer's written instructions.
- B. Use batching, mixing, and placing equipment approved by the manufacturer.
- C. Prevent segregation of material.
- D. Tolerance: Finished surface within 2 inches of elevation indicated on drawings.

**3.05 FIELD QUALITY CONTROL**

- A. Soil Fill Materials:
  - 1. Perform compaction density testing on compacted fill in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.
  - 2. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.
  - 3. If tests indicate work does not meet specified requirements, remove work, replace and retest.

**END OF SECTION**

**SECTION 32 1313  
CONCRETE PAVING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete sidewalks, stair steps, integral curbs, gutters, median barriers, parking areas, and roads.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3000 - Cast-in-Place Concrete.

**1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- B. ACI 305R - Hot Weather Concreting; 2010.
- C. ACI 306R - Cold Weather Concreting; 2010.
- D. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2016a.
- E. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- F. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

**PART 2 PRODUCTS**

**2.01 FORM MATERIALS**

- A. Form Materials: As specified in Section 03 3000, conform to ACI 301.

**2.02 REINFORCEMENT**

- A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 2000.

**2.03 CONCRETE MATERIALS**

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: As specified in Section 03 3000.

**2.04 ACCESSORIES**

- A. Curing Compound: ASTM C309, Type 1, Class A.
- B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

**2.05 CONCRETE MIX DESIGN**

- A. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- B. Concrete Properties:
  - 1. Water-Cement Ratio: Maximum 40 percent by weight.
  - 2. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
  - 3. Maximum Slump: 3 inches.

**2.06 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.

## **PART 3 EXECUTION**

### **3.01 SUBBASE**

### **3.02 PREPARATION**

- A. Moisten base to minimize absorption of water from fresh concrete.

### **3.03 FORMING**

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

### **3.04 REINFORCEMENT**

- A. Place reinforcement at top of slabs-on-grade.
- B. Interrupt reinforcement at contraction joints.

### **3.05 COLD AND HOT WEATHER CONCRETING**

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

### **3.06 PLACING CONCRETE**

- A. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

### **3.07 JOINTS**

- A. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
  - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.

### **3.08 FINISHING**

- A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- B. Curbs and Gutters: Light broom, texture parallel to pavement direction.
- C. Inclined Vehicular Ramps: Broomed perpendicular to slope.

### **3.09 TOLERANCES**

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

### **3.10 PROTECTION**

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

**END OF SECTION**

**SECTION 32 1723.13**  
**PAINTED PAVEMENT MARKINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.

**1.02 SUBMITTALS**

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

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
- B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment accompanied by batch certificate.
- C. Store products in manufacturer's unopened packaging until ready for installation.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.04 FIELD CONDITIONS**

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Line and Zone Marking Paint: MPI (APL) No. 97 Latex Traffic Marking Paint; yellow.
  - 1. Parking Lots: Yellow.
  - 2. Handicapped Symbols: Blue.
- B. Reflective Glass Beads: FS TT-B-1325, Type I (low index of refraction), Gradation A (coarse, drop-on); with silicone or other suitable waterproofing coating to ensure free flow.
- C. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
  - 1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
- D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.
- E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

- F. Temporary Pavement Markings: When required or directed by Architect, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
  - 1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
  - 2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

### **3.02 INSTALLATION**

- A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.
- C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.
- D. Comply with FHWA MUTCD manual (<http://mutcd.fhwa.dot.gov>) for details not shown.
- E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.
- F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
  - 1. Apply paint in one coat only.
  - 2. Wet Film Thickness: 0.015 inch, minimum.
  - 3. Width Tolerance: Plus or minus 1/8 inch.
- G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
  - 1. Mark the International Handicapped Symbol at indicated parking spaces.
  - 2. Hand application by pneumatic spray is acceptable.
- H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

### **3.03 DRYING, PROTECTION, AND REPLACEMENT**

- A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.
- B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.
- C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.
- D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

**END OF SECTION**