

PROJECT MANUAL FOR
MOUNT DESERT FIRE DEPARTMENT STATION #1
RENOVATION & ADDITION

21 Sea Street, Northeast Harbor, Maine

Bid Documents
December 15, 2021

ARCHITECT

Design Group Collaborative
40 Church Street, Studio A
Ellsworth, ME 04605

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DOCUMENT 001116 - INVITATION TO BID

1.1 PROJECT INFORMATION

- A. Notice to Bidders: Bidders are invited to submit bids for Project as described in this Document according to the Instructions to Bidders.
- B. Project Identification: Mount Desert Fire Department – Station #1.
 - 1. Project Location: 21 Sea Street, Northeast Harbor, ME 04662.
- C. Owner: Town of Mount Desert.
- D. Architect: Design Group Collaborative, 40 Church Street, Studio A, Ellsworth, ME 04605. Tel: 207-664-0560.
- E. Project Description: The Work involves the renovation and addition to the existing Mount Desert Fire Department at location indicated on Drawings. Work includes but is not limited to, demolition, ledge removal, earthwork, site utilities and site improvements, paving, and landscaping. Work also includes concrete foundations and slab-on-grade, steel structure, wood trusses and decking, sheet metal, masonry, wood framing and partitions, insulation, gypsum board walls and ceilings, ceramic tile, acoustical ceilings, resilient flooring, custom cabinets and fixtures, carpentry, painting, metal doors, wood doors, metal frames, door hardware, sectional overhead doors, toilet accessories, signage, lockers, fire protection and detection systems, security systems, electrical, and heating, ventilating, and air conditioning complete and ready for use.
- F. Construction Contract: Bids will be received for the following Work:
 - 1. General Contract (all trades).

1.2 BID SUBMITTAL AND OPENING

- A. Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
 - 1. Bid Date: January 14, 2022.
 - 2. Bid Time: 2:00 p.m., local time.
 - 3. Location: Office of Design Group Collaborative, 40 Church Street, Studio A, Ellsworth, ME 04605.
- B. Bids will be thereafter privately opened.

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1.3 BID SECURITY

- A. Bid security shall be submitted with each bid in the amount of 5 percent of the bid amount. No bids may be withdrawn for a period of 120 days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

1.4 PREBID MEETING

- A. A Prebid meeting for all bidders will be held Fire Station on December 22, 2021 at 2:00 p.m., local time. Prospective prime bidders are strongly recommended to attend.
 - 1. A list of attendees will be provided in the first Addendum.
 - 2. Bidders' Questions: Architect will provide a list of questions and responses at Prebid meeting by Addendum.

1.5 DOCUMENTS

- A. Procurement and Contracting Documents will be sent to Invited Bidders only after 5pm, Wednesday, December 15, 2021 by contacting Design Group Collaborative.
- B. Viewing Procurement and Contracting Documents: Examine after 5pm, Wednesday, December 15, 2021, at the locations below:
 - 1. Construction Summary of Maine, Cross Insurance Building, 74 Gilman Road, Bangor, ME 04401.
 - 2. AGC of Maine, Inc.; Whitten Road – P.O. Box 5519, Augusta, ME 04332-5519. *Phone 207-622-4741 Fax 207-622-1625.*
 - 3. Print Bangor, 80 Central St, Bangor, ME 04401.
- C. Copies of Addenda will be mailed, emailed and/or delivered to registered bidders without charge.
- D. All telephone calls and correspondence in connection with this Project will be addressed to the office of the Architect, Attention: Michael Wade, Design Group Collaborative, 40 Church Street, Studio A, Ellsworth, ME 04605. Tel: 207-664-0560. E-MAIL mwade@dgcarchitects.com.

1.6 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Bidders shall begin the Work on May 10, 2022, and shall fully complete the Work on or before October 1, 2023. Work is subject to liquidated damages.

1.7 BIDDER'S QUALIFICATIONS

- A. A Performance Bond, a separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder.

1.8 SPECIAL WARRANTY REQUIREMENTS

- A. All building work shall be guaranteed for a full one year period, and a full two-year warranty on all vegetation such as grass, shrubs, etc., subsequent to final approval. Any actions required to correct work within this warranty period shall be the responsibility of the Contractor. The owner shall hold 2% of the contract amount for a full year following final completion of the final milestone as a surety for completion of warranty items. One month prior to the one year anniversary of final completion a site walk-thru shall be completed by the owner and contractor. Items requiring work and covered by warranty shall be fixed within 30 days of the walk-thru. At the completion of any/all work required to be done under warranty, a release of retainage shall occur. If the contractor, for whatever reason, fails to complete the items specified during the walk-thru the owner shall use the retained monies to complete the work to his satisfaction, with any monies left over being paid to the contractor.

END OF DOCUMENT 001116

MOUNT DESERT FIRE DEPARTMENT – STATION #1

DOCUMENT 002113 - INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

- A. AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.
 - 1. A copy of AIA Document A701, "Instructions to Bidders," is bound in this Project Manual.

END OF DOCUMENT 002113

DRAFT AIA® Document A701™ - 2018

Instructions to Bidders

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

«→Mount Desert Fire Department – Station #1
«→21 Sea Street, Northeast Harbor, Maine 04662
«→ Addition and Renovation to existing Fire Department

THE OWNER:
(Name, legal status, address, and other information)

« »« »Town of Mount Desert
« »21 Sea Street, PO Box 248, Northeast Harbor, Maine 04662
« »
« »

THE ARCHITECT:
(Name, legal status, address, and other information)

« »« »Design Group Collaborative
« »40 Church Street, Studio A, Ellsworth, ME 04605
« »
« »

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

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

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

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



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ARTICLE 1 DEFINITIONS

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

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

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

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

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

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

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

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

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

ARTICLE 2 BIDDER'S REPRESENTATIONS

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

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

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

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

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

« » Procurement and Contracting Documents will be sent to Invited Bidders only after 5pm, Wednesday, December 15, 2021 by contacting Design Group Collaborative.

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

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

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

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

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

§ 3.2 Modification or Interpretation of Bidding Documents

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

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

« » All correspondence in connection with this Project will be addressed to the office of the Architect, Attention: Michael Wade, Design Group Collaborative via E-MAIL mwade@dgcarchitects.com.

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

§ 3.3 Substitutions

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

§ 3.3.2 Substitution Process

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

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

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

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

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

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

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§ 3.4 Addenda

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

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

« » Addenda will be transmitted to Bidders via E-MAIL. Receipt response of E-mail required.

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

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

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

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

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

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

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

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

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

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

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

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

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:
(Insert the form and amount of bid security.)

« » A completed bid bond form is required to be attached to the Bid Form, in the amount constituting five percent (5%) of the Base Bid amount above. AIA Document A310-2010 "Bid Bond" is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement. Copies of AIA standard forms may be obtained from The American Institute of Architects: <https://www.aiacontracts.org/>; email: docsurchases@aia.org; No bids may be withdrawn for a period of 120 days after opening of bids.

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid

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security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

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

§ 4.3 Submission of Bids

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

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

« »Hardcopies of the Bids will be will be delivered to the office of the Architect, Attn: Michael Wade, Design Group Collaborative, 40 Church Street, Studio A, Ellsworth, ME 04605. No later than 2:00pm on Friday January 14, 2022.

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

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

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

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

§ 4.4 Modification or Withdrawal of Bid

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

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

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

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

« »Bid security may be returned when the affected bidder was not the lowest responsive and responsible bidder.

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ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

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

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner reserves the right to reject any or all bids and to again invite bids; to waive such formalities or informalities as do not affect the substantive provisions thereof and to accept any bid deemed advantageous to the Owner, even if said bid is not the low bid, shall have the right to reject any or all Bids.

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§ 5.3 Acceptance of Bid (Award)

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

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

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

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

§ 6.2 Owner's Financial Capability

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

§ 6.3 Submittals

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

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

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

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

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

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

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

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

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

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

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

« »

§ 7.2 Time of Delivery and Form of Bonds

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

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

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

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

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

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

« »

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

« »

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

« »

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

« »

5 Drawings

Number	Title	Date	Pages
Mount Desert Fire Department Station #1 Renovation	Bid Documents	12/15/21	52 Pages

6 Specifications

Section	Title	Date	Pages
Project Manual for Mount Desert Fire Department Station #1 Renovation & Addition	Bid Documents	12/15/21	675 Pages

7 Addenda:

Number	Date	Pages
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8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

The Sustainability Plan:

Title	Date	Pages
-------	------	-------

Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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9 Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

DOCUMENT 004113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Project Identification: Mount Desert Fire Department – Station #1.
 - 1. Project Location: 21 Sea Street, Northeast Harbor, ME 04662.
- C. Owner: Town of Mount Desert.
- D. Architect: Design Group Collaborative, 40 Church Street, Studio A, Ellsworth, ME 04605. Tel: 207-664-0560.

1.2 CERTIFICATIONS AND BASE BID

- A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Design Group Collaborative and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:
 - 1. _____ Dollars (\$_____).
- B. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:
 - 1. This Bid will remain subject to acceptance for 120 days after the day of Bid opening. (the Town is not scheduled to vote on the budget until May 5, 2022)
 - 2. Alternates will remain subject to acceptance for 120 days after the day of Bid opening.
 - 3. The Owner has the right to reject this Bid.
 - 4. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within 15 days after the date of OWNER'S Notice of Award.
 - 5. BIDDER has examined copies of the Bidding Documents.
 - 6. BIDDER has visited the site and become familiar with the general, local and site conditions.
 - 7. BIDDER is familiar with federal, state, and local laws and regulations.
 - 8. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examination, investigations, explorations, tests, studies and data with the Bidding Documents.
 - 9. This Bid is genuine and not made in the interest of or on behalf of an undisclosed person, firm or corporation and is not submitted in conformity with an agreements or rules of a group, association, organization or corporations; BIDDER has not directly or indirectly

MOUNT DESERT FIRE DEPARTMENT – STATION #1

induced or solicited another Bidder to submit a false or sham Bid; BIDDER has not solicited or induced a person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself an advantage over another BIDDER or over OWNER.

1.3 BID GUARANTEE

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within 30 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:
 - 1. _____ Dollars (\$_____).
- B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 TIME OF START AND COMPLETION

- A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on May 10, 2022, 2022, and shall fully complete the Work on or before October 1, 2023.

1.5 LIQUIDATED DAMAGES

- A. BIDDER agrees that Liquidated Damages shall be \$200 per day.

1.6 ACKNOWLEDGEMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:
 - 1. Addendum No. 1, dated _____.
 - 2. Addendum No. 2, dated _____.
 - 3. Addendum No. 3, dated _____.
 - 4. Addendum No. 4, dated _____.

1.7 ALLOWANCES

- A. The above amount includes the Allowances listed in Division 01 Section "Allowances".

1.8 ALTERNATES

- A. Alternate No. 1: Metal Roofing (\$_____) (add)

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.9 UNIT PRICES

- A. Unit Price No. 1: Rock Excavation \$ _____/CY

1.10 BID SUPPLEMENTS

- A. The following supplements are a part of this Bid Form and are attached hereto.

1. Bid Form Supplement - Bid Bond Form (AIA Document A310-2010).

1.11 SUBMISSION OF BID

- A. Respectfully submitted this ____ day of _____, 2022.
- B. Submitted By: _____ (Name of bidding firm or corporation).
- C. Authorized Signature: _____ (Handwritten signature).
- D. Signed By: _____ (Type or print name).
- E. Title: _____ (Owner/Partner/President/Vice President).
- F. Street Address: _____.
- G. City, State, Zip: _____.
- H. Phone: _____.

END OF DOCUMENT 004113

MOUNT DESERT FIRE DEPARTMENT – STATION #1

DOCUMENT 004313 - BID SECURITY FORMS

1.1 BID FORM SUPPLEMENT

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

1.2 BID BOND FORM

- A. AIA Document A310-2010 "Bid Bond" is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement.
- B. Copies of AIA standard forms may be obtained from The American Institute of Architects; <https://www.aiacontracts.org/>; email: docspurchases@aia.org; (800) 942-7732.

END OF DOCUMENT 004313

MOUNT DESERT FIRE DEPARTMENT – STATION #1

DOCUMENT 005000 – CONTRACTING FORMS AND SUPPLEMENTS

PART 1 - GENERAL

1.1 AGREEMENT AND CONDITIONS OF THE CONTRACT

- A. See Section 005213 for the Agreement form to be executed.
- B. General Conditions are included in the Agreement.
- C. The Agreement is based on AIA A105 - 2017.

1.2 FORMS

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.
- B. Preconstruction Forms:
 - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312, "Performance Bond and Payment Bond."
- C. Post-Award Certificates and Other Forms:
 - 1. Schedule of Values Form: AIA G703.
 - 2. Application for Payment Form: AIA G702 and G703.
- D. Clarification and Modification Forms:
 - 1. Supplemental Instruction Form: AIA G710.
 - 2. Construction Change Directive Form: AIA G714.
 - 3. Change Order Form: AIA G701.
- E. Closeout Forms:
 - 1. Certificate of Substantial Completion Form: AIA G704.

1.3 REFERENCE STANDARDS

- A. AIA A105 - Standard Short Form of Agreement Between Owner and Contractor; 2017.
- B. AIA G701 - Change Order; 2001.
- C. AIA G702 - Application and Certificate for Payment; 1992.
- D. AIA G703 - Continuation Sheet; 1992.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- E. AIA G704 - Certificate of Substantial Completion; 2000.
- F. AIA G710 - Architect's Supplemental Instructions; 1992.
- G. AIA G714 - Construction Change Directive; 2007.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF DOCUMENT 005000

MOUNT DESERT FIRE DEPARTMENT – STATION #1

DOCUMENT 005213 – AGREEMENT FORM A105

PART 1 - GENERAL

1.1 FORM OF AGREEMENT

1.2 The Agreement to be executed is attached following this page.

1.3 RELATED REQUIREMENTS

A. General Conditions are included in the Agreement.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF DOCUMENT 005213

DRAFT AIA® Document A105™ - 2017

Standard Short Form of Agreement Between Owner and Contractor

AGREEMENT made as of the «Tenth» day of «May» in the year «Two Thousand Twenty-two»

(In words, indicate day, month and year.)

BETWEEN the Owner:

(Name, legal status, address and other information)

« » « » » Town of Mount Desert
« » » 21 Sea Street, PO Box 248, Northeast Harbor, Maine 04662
« »
« »

and the Contractor:

(Name, legal status, address and other information)

« » « »
« »
« »
« »

for the following Project:

(Name, location and detailed description)

«Mount Desert Fire Department - Station #1 Renovation»
«21 Sea Street, Northeast Harbor, Maine 04662»
«Addition and Renovation to existing Fire Department»

The Architect:

(Name, legal status, address and other information)

« » « » » Design Group Collaborative
« » » 40 Church Street, Studio A, Ellsworth, ME 04605
« »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

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TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 3 CONTRACT SUM
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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contractor shall complete the Work described in the Contract Documents for the Project. The Contract Documents consist of

.1 this Agreement signed by the Owner and Contractor;

.2 the drawings and specifications prepared by the Architect, dated «12/15/21-», and enumerated as follows:

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Drawings:

Number	Title	Date	Pages
	Mount Desert Fire Department Station #1 Renovation Bid Documents	12/15/21	52 Pages

Specifications:

Section	Title	Pages
	Project Manual for Mount Desert Fire Department Station #1 Renovation & Addition Bid Documents	675 Pages

.3 addenda prepared by the Architect as follows:

Number	Date	Pages

- .4 written orders for changes in the Work, pursuant to Article 10, issued after execution of this Agreement; and
- .5 other documents, if any, identified as follows:

« »

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The Contract Time is the number of calendar days available to the Contractor to substantially complete the Work.

§ 2.2 Date of Commencement:
 Unless otherwise set forth below, the date of commencement shall be the date of this Agreement.
(Insert the date of commencement if other than the date of this Agreement.)

« »

§ 2.3 Substantial Completion:
 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion, as defined in Section 12.5, of the entire Work:
(Check the appropriate box and complete the necessary information.)

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

[] By the following date: « Oct 1, 2023 »

ARTICLE 3 CONTRACT SUM

§ 3.1 The Contract Sum shall include all items and services necessary for the proper execution and completion of the Work. Subject to additions and deductions in accordance with Article 10, the Contract Sum is:

« » (\$ « »)

§ 3.2 For purposes of payment, the Contract Sum includes the following values related to portions of the Work:
(Itemize the Contract Sum among the major portions of the Work.)

Portion of the Work	Value

§ 3.3 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and hereby accepted by the Owner:
(Identify the accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 3.4 Allowances, if any, included in the Contract Sum are as follows:
(Identify each allowance.)

Item	Price
Exterior Painted Wood Sign	\$2,000
Soils Compaction & Concrete Testing	\$6,000

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

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

ARTICLE 4 PAYMENTS

§ 4.1 Based on Contractor's Applications for Payment certified by the Architect, the Owner shall pay the Contractor, in accordance with Article 12, as follows:

(Insert below timing for payments and provisions for withholding retainage, if any.)

« » Payments by the Owner to the Contractor shall be made monthly on a date to be determined. The Owner shall withhold 5% of the money due to Contractor until the work under the Contract has been accepted by or for the Owner. The Owner may, upon the completion of part or parts of the contract and with the approval of the General Contractor and Designer, pay all or part of the retainage on those parts completed as the Owner deems prudent, provided satisfactory release of lien has been provided.

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§ 4.2 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate below, or in the absence thereof, at the legal rate prevailing at the place of the Project.

(Insert rate of interest agreed upon, if any.)

« » % « »

ARTICLE 5 INSURANCE

§ 5.1 The Contractor shall maintain the following types and limits of insurance until the expiration of the period for correction of Work as set forth in Section 14.2, subject to the terms and conditions set forth in this Section 5.1:

§ 5.1.1 Commercial General Liability insurance for the Project, written on an occurrence form, with policy limits of not less than « » (\$ « 1,000,000 ») each occurrence, « » (\$ « 2,000,000 ») general aggregate, and « » (\$ « ») aggregate for products-completed operations hazard.

§ 5.1.2 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than « » (\$ « 1,000,000 ») per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance, and use of those motor vehicles along with any other statutorily required automobile coverage.

§ 5.1.3 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided that such primary and excess or umbrella insurance policies result in the same or greater coverage as those required under Section 5.1.1 and 5.1.2, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 5.1.4 Workers' Compensation at statutory limits.

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

§ 5.1.6 The Contractor shall provide builder's risk insurance to cover the total value of the entire Project on a replacement cost basis.

§ 5.1.7 Other Insurance Provided by the Contractor

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

Coverage	Limits

§ 5.2 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance and shall provide property insurance to cover the value of the Owner's property. The Contractor is entitled to receive an increase in the Contract Sum equal to the insurance proceeds related to a loss for damage to the Work covered by the Owner's property insurance.

§ 5.3 The Contractor shall obtain an endorsement to its Commercial General Liability insurance policy to provide coverage for the Contractor's obligations under Section 8.12.

§ 5.4 Prior to commencement of the Work, each party shall provide certificates of insurance showing their respective coverages.

§ 5.5 Unless specifically precluded by the Owner's property insurance policy, the Owner and Contractor waive all rights against (1) each other and any of their subcontractors, suppliers, agents, and employees, each of the other; and (2) the Architect, Architect's consultants, and any of their agents and employees, for damages caused by fire or other causes of loss to the extent those losses are covered by property insurance or other insurance applicable to the Project, except such rights as they have to the proceeds of such insurance.

ARTICLE 6 GENERAL PROVISIONS

§ 6.1 The Contract

The Contract represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a written modification in accordance with Article 10.

§ 6.2 The Work

The term "Work" means the construction and services required by the Contract Documents, and includes all other labor, materials, equipment, and services provided, or to be provided, by the Contractor to fulfill the Contractor's obligations.

§ 6.3 Intent

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

§ 6.4 Ownership and Use of Architect's Drawings, Specifications and Other Documents

Documents prepared by the Architect are instruments of the Architect's service for use solely with respect to this Project. The Architect shall retain all common law, statutory, and other reserved rights, including the copyright. The Contractor, subcontractors, sub-subcontractors, and suppliers are authorized to use and reproduce the instruments of service solely and exclusively for execution of the Work. The instruments of service may not be used for other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Architect.

§ 6.5 Electronic Notice

Written notice under this Agreement may be given by one party to the other by email as set forth below.

(Insert requirements for delivering written notice by email such as name, title, and email address of the recipient, and whether and how the system will be required to generate a read receipt for the transmission.)

« » **Written notice may be given via EMAIL provided the notice includes the name, title and email address of the recipient and a read receipt is generated upon opening.**

ARTICLE 7 OWNER

§ 7.1 Information and Services Required of the Owner

§ 7.1.1 If requested by the Contractor, the Owner shall furnish all necessary surveys and a legal description of the site.

§ 7.1.2 Except for permits and fees under Section 8.7.1 that are the responsibility of the Contractor, the Owner shall obtain and pay for other necessary approvals, easements, assessments, and charges.

§ 7.1.3 Prior to commencement of the Work, at the written request of the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence.

§ 7.2 **Owner's** Right to Stop the Work

If the Contractor fails to correct Work which is not in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work until the correction is made.

§ 7.3 **Owner's** Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies, correct such deficiencies. In such case, the Architect may withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the cost of correction, provided the actions of the Owner and amounts charged to the Contractor were approved by the Architect.

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

§ 7.4.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project.

§ 7.4.2 The Contractor shall coordinate and cooperate with the Owner's own forces and separate contractors employed by the Owner.

ARTICLE 8 CONTRACTOR

§ 8.1 Review of Contract Documents and Field Conditions by Contractor

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

§ 8.1.2 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner. Before commencing activities, the Contractor shall (1) take field measurements and verify field conditions; (2) carefully compare this and other information known to the Contractor with the Contract Documents; and (3) promptly report errors, inconsistencies, or omissions discovered to the Architect.

§ 8.2 **Contractor's** Construction Schedule

The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work.

§ 8.3 Supervision and Construction Procedures

§ 8.3.1 The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work.

§ 8.3.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner, through the Architect, the names of subcontractors or suppliers for each portion of the Work. The Contractor shall not contract with any subcontractor or supplier to whom the Owner or Architect have made a timely and reasonable objection.

§ 8.4 Labor and Materials

§ 8.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work.

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

§ 8.5 Warranty

The Contractor warrants to the Owner and Architect that: (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract Documents. Any material or equipment warranties required by the Contract Documents

shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 12.5.

§ 8.6 Taxes

The Contractor shall pay sales, consumer, use, and similar taxes that are legally required when the Contract is executed.

§ 8.7 Permits, Fees and Notices

§ 8.7.1 The Contractor shall obtain and pay for the building permit and other permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work.

§ 8.7.2 The Contractor shall comply with and give notices required by agencies having jurisdiction over the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs. The Contractor shall promptly notify the Architect in writing of any known inconsistencies in the Contract Documents with such governmental laws, rules, and regulations.

§ 8.8 Submittals

The Contractor shall promptly review, approve in writing, and submit to the Architect shop drawings, product data, samples, and similar submittals required by the Contract Documents. Shop drawings, product data, samples, and similar submittals are not Contract Documents.

§ 8.9 Use of Site

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the Contract Documents, and the Owner.

§ 8.10 Cutting and Patching

The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

§ 8.11 Cleaning Up

The Contractor shall keep the premises and surrounding area free from accumulation of debris and trash related to the Work. At the completion of the Work, the Contractor shall remove its tools, construction equipment, machinery, and surplus material; and shall properly dispose of waste materials.

§ 8.12 Indemnification

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

ARTICLE 9 ARCHITECT

§ 9.1 The Architect will provide administration of the Contract as described in the Contract Documents. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 9.2 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the Work.

§ 9.3 The Architect will not have control over or charge of, and will not be responsible for, construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

§ 9.4 Based on the Architect's observations and evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor.

§ 9.5 The Architect has authority to reject Work that does not conform to the Contract Documents.

§ 9.6 The Architect will promptly review and approve or take appropriate action upon Contractor's submittals, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 9.7 On written request from either the Owner or Contractor, the Architect will promptly interpret and decide matters concerning performance under, and requirements of, the Contract Documents.

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

§ 9.9 The Architect's duties, responsibilities, and limits of authority as described in the Contract Documents shall not be changed without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

ARTICLE 10 CHANGES IN THE WORK

§ 10.1 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract, consisting of additions, deletions or other revisions, and the Contract Sum and Contract Time shall be adjusted accordingly, in writing. If the Owner and Contractor cannot agree to a change in the Contract Sum, the Owner shall pay the Contractor its actual cost plus reasonable overhead and profit.

§ 10.2 The Architect may authorize or order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. Such authorization or order shall be in writing and shall be binding on the Owner and Contractor. The Contractor shall proceed with such minor changes promptly.

§ 10.3 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be subject to equitable adjustment.

ARTICLE 11 TIME

§ 11.1 Time limits stated in the Contract Documents are of the essence of the Contract.

§ 11.2 If the Contractor is delayed at any time in progress of the Work by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes beyond the Contractor's control, the Contract Time shall be subject to equitable adjustment.

§ 11.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the responsible party.

ARTICLE 12 PAYMENTS AND COMPLETION

§ 12.1 Contract Sum

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

§ 12.2 Applications for Payment

§ 12.2.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for Work completed in accordance with the values stated in this Agreement. The Application shall be supported by data substantiating the Contractor's right to payment as the Owner or Architect may reasonably require, such as evidence of payments made to, and waivers of liens from, subcontractors and suppliers. Payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may

similarly be made for materials and equipment stored, and protected from damage, off the site at a location agreed upon in writing.

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

§ 12.3 Certificates for Payment

The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in part; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole. If certification or notification is not made within such seven day period, the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time and the Contract Sum shall be equitably adjusted due to the delay.

§ 12.4 Progress Payments

§ 12.4.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner provided in the Contract Documents.

§ 12.4.2 The Contractor shall promptly pay each subcontractor and supplier, upon receipt of payment from the Owner, an amount determined in accordance with the terms of the applicable subcontracts and purchase orders.

§ 12.4.3 Neither the Owner nor the Architect shall have responsibility for payments to a subcontractor or supplier.

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

§ 12.5 Substantial Completion

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

§ 12.5.2 When the Contractor believes that the Work or designated portion thereof is substantially complete, it will notify the Architect and the Architect will make an inspection to determine whether the Work is substantially complete. When the Architect determines that the Work is substantially complete, the Architect shall prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, establish the responsibilities of the Owner and Contractor, and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 12.6 Final Completion and Final Payment

§ 12.6.1 Upon receipt of a final Application for Payment, the Architect will inspect the Work. When the Architect finds the Work acceptable and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment.

§ 12.6.2 Final payment shall not become due until the Contractor submits to the Architect releases and waivers of liens, and data establishing payment or satisfaction of obligations, such as receipts, claims, security interests, or encumbrances arising out of the Contract.

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

ARTICLE 13 PROTECTION OF PERSONS AND PROPERTY

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including all those required by law in connection with performance of the Contract. The Contractor shall take reasonable precautions to prevent damage, injury, or loss to employees on the Work and other persons who may be affected thereby, the Work and materials and equipment to be incorporated therein, and other property at the site or adjacent thereto. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, or by anyone for whose acts the Contractor may be liable.

ARTICLE 14 CORRECTION OF WORK

§ 14.1 The Contractor shall promptly correct Work rejected by the Architect as failing to conform to the requirements of the Contract Documents. The Contractor shall bear the cost of correcting such rejected Work, including the costs of uncovering, replacement, and additional testing.

§ 14.2 In addition to the Contractor's other obligations including warranties under the Contract, the Contractor shall, for a period of one year after Substantial Completion, correct work not conforming to the requirements of the Contract Documents.

§ 14.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 7.3.

ARTICLE 15 MISCELLANEOUS PROVISIONS

§ 15.1 Assignment of Contract

Neither party to the Contract shall assign the Contract as a whole without written consent of the other.

§ 15.2 Tests and Inspections

§ 15.2.1 At the appropriate times, the Contractor shall arrange and bear cost of tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities.

§ 15.2.2 If the Architect requires additional testing, the Contractor shall perform those tests.

§ 15.2.3 The Owner shall bear cost of tests, inspections, or approvals that do not become requirements until after the Contract is executed. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 15.3 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules.

ARTICLE 16 TERMINATION OF THE CONTRACT

§ 16.1 Termination by the Contractor

If the Work is stopped under Section 12.3 for a period of 14 days through no fault of the Contractor, the Contractor may, upon seven additional days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, and costs incurred by reason of such termination.

§ 16.2 Termination by the Owner for Cause

§ 16.2.1 The Owner may terminate the Contract if the Contractor

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

§ 16.2.2 When any of the above reasons exist, the Owner, after consultation with the Architect, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may

- .1 take possession of the site and of all materials thereon owned by the Contractor, and
- .2 finish the Work by whatever reasonable method the Owner may deem expedient.

§ 16.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 16.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 16.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract.

§ 16.3 Termination by the Owner for Convenience

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 17 OTHER TERMS AND CONDITIONS

(Insert any other terms or conditions below.)

17.1 The Contractor and the Contractor's surety, if any, shall be liable for and shall pay the Owner the sum of \$200 as liquidated damages for each calendar day of delay until the work is substantially complete.

17.2 The Owner shall withhold 5% of the money due to Contractor until the work under the Contract has been accepted by or for the Owner. The Owner may, upon the completion of part or parts of the contract and with the approval of the General Contractor and Designer, pay all or part of the retainage on those parts completed as the Owner deems prudent, provided satisfactory release of lien has been provided.

17.2.1 All work shall be guaranteed for a full one year period subsequent to final approval, with a full two-year warranty on all vegetation such as grass, shrubs, etc. Any actions required to correct work within this warranty period shall be the responsibility of the Contractor. The owner shall hold 2% of the contract amount for a full year following final completion of the final milestone as a surety for completion of warranty items. One month prior to the one year anniversary of final completion a site walk-thru shall be completed by the owner and contractor. Items requiring work and covered by warranty shall be fixed within 30 days of the walk-thru. At the completion of any/all work required to be done under warranty, a release of retainage shall occur. If the contractor, for whatever reason, fails to complete the items specified during the walk-thru the owner shall use the retained monies to complete the work to his satisfaction, with any monies left over being paid to the contractor.

17.3 Liability Insurance shall be carried with Town of Mount Desert listed as additionally insured for the following limits: <->

<u>General Liability</u>	<u>\$2,000,000</u>
<u>Each occurrence</u>	<u>\$1,000,000</u>
<u>Automobile Liability</u>	<u>\$1,000,000</u>
<u>Workers Compensation</u>	<u>As prescribed by Law</u>

The Insurance Certificate shall stipulate that a per project endorsement applies

17.4 "Reasonable overhead and profit", as described in Article 12, shall mean an allowance to be added to or subtracted from the "cost" in lieu of overhead and profit and of any other expense which is not included in the cost of the Work covered by the change. Percentage for a Contractor shall be 15% of any net increase or decrease of Cost of any Work performed by his own forces and 10% for Work performed by any Subcontractors.

This Agreement entered into as of the day and year first written above.
(If required by law, insert cancellation period, disclosures or other warning statements above the signatures.)

« »

OWNER (Signature)
« »

(Printed name and title)

CONTRACTOR (Signature)
« »

(Printed name and title)
LICENSE NO.:
JURISDICTION:



SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work performed by Owner.
5. Owner-furnished/Contractor-installed (OFCD) products.
6. Owner-furnished/Owner-installed (OFOI) products.
7. Contractor's use of site and premises.
8. Coordination with occupants.
9. Work restrictions.
10. Specification and Drawing conventions.
11. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.2 PROJECT INFORMATION

A. Project Identification: Mount Desert Fire Department – Station #1.

1. Project Location: 21 Sea Street, Northeast Harbor, ME 04662.

B. Owner: Town of Mount Desert.

C. Architect: Design Group Collaborative, 40 Church Street, Studio A, Ellsworth, ME 04605. Tel: 207-664-0560.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. The Work involves the renovation and addition to the existing Mount Desert Fire Department at location indicated on Drawings. Work includes but is not limited to, demolition, ledge removal, earthwork, site utilities and site improvements, paving, and landscaping. Work also includes concrete foundations and slab-on-grade, steel structure, wood trusses and decking, sheet metal, masonry, wood framing and partitions, insulation,

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gypsum board walls and ceilings, ceramic tile, acoustical ceilings, resilient flooring, custom cabinets and fixtures, carpentry, painting, metal doors, wood doors, metal frames, door hardware, sectional overhead doors, toilet accessories, signage, lockers, fire protection and detection systems, security systems, electrical, and heating, ventilating, and air conditioning complete and ready for use.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

C. Contract Type: AIA A105 - Standard Short Form of Agreement Between Owner and Contractor.

1.4 PHASED CONSTRUCTION

A. The Work shall be conducted in two phases to provide the least possible interference to Owner's activities and to permit an orderly transfer of personnel and equipment to new facilities.

1. Building Phase 1: Work may begin on Fire Department Office August 1, 2022 and shall be substantially complete, ready for occupancy within 150 days.
2. Building Phase 2: Work on new addition may begin concurrently with work on Phase 1. Building shall be substantially complete and ready for occupancy on or before October 1, 2023.
3. Civil Phase Areas 1 and 2: Refer to Civil drawing C-1. Work may begin on or about May 10, 2022 and be substantially complete on or before June 30, 2022.
 - a. Note: Site Phasing is at the Contractor's option provided that no work in Phase Areas 1 and 2 occur in the months of July or August of 2022 or 2023.
4. Civil Phase Area 3: Work may begin on or about May 10, 2022 and be substantially complete on or before October 1, 2023.

1.5 WORK PERFORMED BY OWNER

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

B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.

1. Tel/Data/Communications.
2. Photovoltaic collectors.
3. Door access control and card readers.

1.6 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFICI) PRODUCTS

A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:

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1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
2. Provide for delivery of Owner-furnished products to Project site.
3. Upon delivery, inspect, with Contractor present, delivered items.
 - a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
4. Obtain manufacturer's inspections, service, and warranties.
5. Inform Contractor of earliest available delivery date for Owner-furnished products.

B. Contractor's Responsibilities: The Work includes the following, as applicable:

1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
3. Receive, unload, handle, store, protect, and install Owner-furnished products.
4. Make building services connections for Owner-furnished products.
5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
6. Repair or replace Owner-furnished products damaged following receipt.

C. Owner-Furnished/Contractor-Installed (OFCI) Products:

1. Air compressor.
2. Extractor.
3. Gear Lockers.
4. Range.
5. Refrigerator.
6. Microwave.
7. Dishwasher.
8. Washer.
9. Dryer.
10. Hose suspension system.

1.7 OWNER-FURNISHED/OWNER-INSTALLED (OFOI) PRODUCTS

A. The Owner will furnish and install products indicated.

B. Owner-Furnished/Owner-Installed (OFOI) Products:

1. Fill station.
2. Bike.
3. Cross trainer.
4. Tower winch.
5. Fall arrest system.
6. Weight machine.
7. Trilogy Prox Locks.

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1.8 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section. Owner will occupy the Town Office and Police Department areas of the building. The Fire Department area will be vacated.
- B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated. Refer to civil drawings for additional information.
 - 1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - 2. Contractor can use the upper Sea Street access and the Harbor Drive entrance(s) for construction, but not the lower Sea Street entrance to the Town Office/Police Station parking lot.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.9 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner and public will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with

completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.10 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 a.m. (except to warm equipment at 6:30 a.m.) to 6:00 p.m., Monday through Friday, except otherwise indicated.
 1. Weekend Hours: As approved by Architect and Owner.
 2. Early Morning Hours: As approved by Architect and Owner.
 3. Hours for Utility Shutdowns: As approved by Architect and Owner.
 4. Provide 24 hour notice to Architect when performing work other than normal working hours.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Smoking and Controlled Substance Restrictions: Use of tobacco products and other controlled substances within the existing building is not permitted.

1.11 SITE ACCESS, PREPARATION & PROTECTION

- A. Special precautions shall be directed toward avoiding damage to private property improvements including fences, shade trees, shrubs, hedges and similar objects. Any such objects destroyed by the Contractor in his operations shall be replaced at his own expense with the exception of items designated for permanent removal by the Engineer.

- B. Damage to road pavement, lawns and grounds outside the immediate work area, occasioned by access of trucks and equipment, vehicle parking, materials storage, or other causes, shall be repaired to the satisfaction of the property owner and the town by the Contractor at his own expense. If applicable, where access must be obtained across private property, the Contractor is expected to make his own arrangements with the property owner and to confine vehicle traffic to the agreed route. Metal-tracked equipment shall not be allowed directly on finished road pavement that is not being replaced. Plywood or other protective surface must be used to protect town roads.
- C. Materials and structures to be replaced shall be restored to their original condition and location as closely as possible, and any damage to such objects shall be repaired using the same or similar to the original.
- D. All trees, slash, stubs, bushes, shrubs, plants and debris to be removed for purposes of the work shall be cleared and burned, or disposed of otherwise in a manner and place approved by the Engineer. All stumps shall be cut off as close to the ground as practicable and in no case shall they project more than 4 inches above the surrounding ground surface.
- E. All burning shall be done in accordance with applicable laws and ordinances, under the care of competent persons, and in such manner and at such locations that adjacent properties, trees and growth to remain, overhead cables and wires, etc., will not be jeopardized. The Contractor will be held responsible for damage caused by fires and shall be responsible for obtaining necessary permits for burning.

1.12 TOWN ROAD REQUIREMENTS

- A. All work within the right-of-way of roads must be completed to the satisfaction of the Town Public Works Dept. A final inspection by an authorized Public works representative shall be made prior to final payment by the Owner. All work shall be guaranteed for a full one year period subsequent to the final approval. Any actions required to correct work within this warranty period shall be the responsibility of the Contractor.

1.13 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.

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4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Testing and inspecting allowances.
- C. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Section 014000 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.2 DEFINITIONS

- A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.3 SELECTION AND PURCHASE

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

1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

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1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 LUMP-SUM ALLOWANCES

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

1.7 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of testing and inspection services not specifically required by the Contract Documents are Contractor responsibilities and are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.8 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting

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losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.
- C. Return unused amounts for credit to Owner in their entirety.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Lump-Sum Allowance: Include the sum of \$2,000 for exterior painted wood sign.
- B. Allowance No. 2: Testing and Inspection Allowance: Include the sum of \$6,000.00 for In-Place Soils Compaction and Concrete Testing.

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1.

a. Soils Compaction Testing: This allowance is for in-place soil compaction testing. The Contractor shall be responsible for obtaining proctors and gradations for submittal review at their cost and not as part of this allowance. Additionally, the Contractor shall be responsible for the cost of failing tests for compaction testing, including the cost of travel to and from the site of the testing entity. The frequency of testing will be determined by the Engineer and be coordinated by the Contractor.

b. Concrete testing: Field testing of concrete and laboratory testing of cylinders taken by the testing agency shall be paid for by this allowance. Re-testing materials that fail to meet the requirements of the contract shall be paid for by the Contractor.

END OF SECTION 012100

MOUNT DESERT FIRE DEPARTMENT – STATION #1

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

- A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1 – Rock Excavation (trench) and replacement with satisfactory soil material:
 - 1. Description: Classified rock excavation and disposal off-site and replacement with satisfactory fill material or engineered fill from off-site, as required, according to Section 312000 "Earth Moving."

MOUNT DESERT FIRE DEPARTMENT – STATION #1

2. Unit of Measurement: Cubic yard of rock excavated, based on survey of in-place surveys volume of before and after removal.

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

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

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.
- C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Metal Roofing.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Base Bid: Provide asphalt roof shingles as indicated on Drawings and as specified in Section 073113 "Asphalt Shingles."
2. Alternate: Provide metal roofing as indicated on Drawings and as specified in Section 074113.16 "Standing Seam Metal Roof Panels."

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012300 "Alternates" for products selected under an alternate.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit electronic copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form attached to the end of this section.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.

- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within three days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution by addendum.
- a. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated or notification is not made by addendum.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.
- B. Products with asbestos: Asbestos containing materials are not to be purchased or installed in this project.

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within the time indicated in A701 – Instructions to Bidders. Requests received after that time may be considered or rejected at discretion of Architect
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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SUBSTITUTION REQUEST FORM

Project: _____ Substitution Request Number: _____
To: _____ From: _____
Re: _____ Date: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No. _____

Attached data includes product description, specifications, drawings, and performance and test data adequate for evaluation of the request: applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitutions will require for its proper installation.

The Undersigned certifies:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the Substitution as for the specified Product.
3. Will provide no additional cost to the Owner.
4. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
5. Waive claims for additional costs or time extension that may subsequently become apparent.
6. Will reimburse Owner and Architect/Engineer for review or redesign services associated with substitution.

Submitted By: _____
Signed By: _____
Firm: _____
Address: _____
Telephone: _____ Fax: _____

A/E's REVIEW AND ACTION

- Submission approved - Make submittals in accordance with Specification Section 013300.
 Submission approved as noted - Make submittals in accordance with Specification Section 013300.
 Submission rejected - Use specified materials.
 Submission request received too late - Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports
 Other _____

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

1.2 MINOR CHANGES IN THE WORK

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

1.3 PROPOSAL REQUESTS

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

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1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.5 CONSTRUCTION CHANGE DIRECTIVE

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

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

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:

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- a. Project name and location.
 - b. Owner's name.
 - c. Owner's Project number.
 - d. Name of Architect.
 - e. Architect's Project number.
 - f. Contractor's name and address.
 - g. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 7. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
 8. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 9. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 10. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 11. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

- C. Draw-Down Schedule: The Contractor shall furnish to the Architect, at the beginning of the project, an expected monthly requisition estimate for the Owner’s use in planning funding.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
 - 1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
 - 1. Other Application for Payment forms proposed by the Contractor may be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

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- c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required. Electronic distribution will be acceptable.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. The list of subcontractors, principal suppliers and fabricators shall be used to designate which entities involved in the Work must submit waivers. The list shall be approved by the Owner.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Record Drawing Updates: With each Application of Payment, record documents shall be maintained and current for all trades, available for viewing at a central location.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Submittal schedule (preliminary if not final).
 6. Copies of building permits.
 7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 8. Certificates of insurance and insurance policies.
 9. Performance and payment bonds.
- J. Progress Applications for Payment: Administrative actions and submittals that must precede or coincide with submittal of progress Applications for Payment include the following:
 1. Contractor's Construction Schedule update.
 2. Submittals for Work being requisitioned for are complete and approved.
 3. Submit list of completed tests, checklists, commissioning, reports, and similar requirements for the work are submitted and in compliance with the Contract Documents.

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4. Minutes of previous month's progress meeting have been distributed.
 5. Record drawings and documents are current.
- K. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- L. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Certification of completion of final punch list items.
 3. Final submittal of record documents and operation, maintenance data and demonstration and training.
 4. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 5. Updated final statement, accounting for final changes to the Contract Sum.
 6. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement, if applicable.
 10. Proof that taxes, fees, and similar obligations are paid.
 11. Waivers and releases.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written list identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses.
 - 1. Post copies of list in Project meeting room, in temporary field office, and in prominent location in built facility. Keep list current at all times.

1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical. Coordinate location of pipes, conduits, ducts and similar items in confined areas to assure proper fit and access. Contractor is responsible for handling interferences created by the work of subcontractors (example, sprinkler pipe interfering with installation of duct work; duct work interfering with installation of light fixtures, overhead construction interfering with installation of finish ceilings at proper height).
 5. Coordinate the work to provide smoke and fire seals for component interfaces and penetrations of smoke walls and fire rated construction.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.

1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

3. No work should proceed where there is an unresolved conflict in the contract documents. If there are conflicting details or requirements the Contractor must resolve them with the Design Team before proceeding with the work.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Owner name.
 3. Owner's Project number.
 4. Name of Architect.
 5. Architect's Project number.
 6. Date.
 7. Name of Contractor.
 8. RFI number, numbered sequentially.
 9. RFI subject.
 10. Specification Section number and title and related paragraphs, as appropriate.
 11. Drawing number and detail references, as appropriate.
 12. Field dimensions and conditions, as appropriate.
 13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 14. Contractor's signature.
 15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number, including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned

parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Procedures for processing field decisions and Change Orders.
 - h. Procedures for RFIs.
 - i. Procedures for testing and inspecting.
 - j. Procedures for processing Applications for Payment.
 - k. Distribution of the Contract Documents.
 - l. Submittal procedures.
 - m. Sustainable design requirements.
 - n. Preparation of Record Documents.
 - o. Use of the premises and existing building.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.

- e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for completing sustainable design documentation.
 - f. Requirements for preparing operations and maintenance data.

- g. Requirements for delivery of material samples, attic stock, and spare parts.
 - h. Requirements for demonstration and training.
 - i. Preparation of Contractor's punch list.
 - j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - k. Submittal procedures.
 - l. Coordination of separate contracts.
 - m. Owner's partial occupancy requirements.
 - n. Installation of Owner's furniture, fixtures, and equipment.
 - o. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at monthly intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Application for Payment: Contractor shall bring copy of Application for Payment to meeting. Review Application for Payment and required attachments, including record drawing and documents status, waivers of mechanic's liens, list of completed tests, checklists, commissioning, reports, and similar requirements for the work are submitted and in compliance with the Contract Documents.
 - c. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.

- 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of Proposal Requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F. Coordination Meetings: Conduct Project coordination meetings at regular intervals, typically weekly. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Work hours.

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- 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of RFIs.
 - 14) Proposal Requests.
 - 15) Change Orders.
 - 16) Pending changes.
3. Conduct coordination meetings with the mechanical, plumbing, sprinkler and electrical trades. Before the trades start work in an area of the building, make field measurements, review structural clearances and locations of ducts, pipes, conduits, light fixtures, equipment and other items that affect location and proper fit. Prepare coordination sketches to maximize utilization of space for efficient installation of different components. Verify depths and clearances before fabrication of ductwork.
 4. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's construction schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Site condition reports.
 - 7. Unusual event reports.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- C. Event: The starting or ending point of an activity.
- D. Float: The measure of leeway in starting and completing an activity.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file.
- B. Startup construction schedule.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.

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- E. Daily Construction Reports: Submit at weekly intervals.
- F. Material Location Reports: Submit at monthly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Special Reports: Submit at time of unusual event.

1.4 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Discuss constraints, including phasing, work stages, area separations and milestones.
 - 2. Review delivery dates for Owner-furnished products.
 - 3. Review submittal requirements and procedures.
 - 4. Review time required for review of submittals and resubmittals.
 - 5. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 6. Review time required for Project closeout and Owner startup procedures.
 - 7. Review and finalize list of construction activities to be included in schedule.
 - 8. Review procedures for updating schedule.

1.5 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
 - 3. Allow for time in the construction schedule for materials to dry before they are enclosed to prevent the growth of mold and bacteria

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

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1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than 5 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Building flush-out.

- m. Startup and placement into final use and operation.
6. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- 1. Temporary enclosure and space conditioning.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
- 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.
- F. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
- 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- G. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
- 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.7 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.8 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for commencement of the Work. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.9 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 7. Testing and inspection.
 - 8. Accidents.
 - 9. Meetings and significant decisions.
 - 10. Unusual events (see special reports).
 - 11. Stoppages, delays, shortages, and losses.
 - 12. Meter readings and similar recordings.
 - 13. Emergency procedures.
 - 14. Orders and requests of authorities having jurisdiction.
 - 15. Change Orders received and implemented.
 - 16. Construction Change Directives received and implemented.
 - 17. Services connected and disconnected.
 - 18. Equipment or system tests and startups.
 - 19. Partial completions and occupancies.
 - 20. Substantial Completions authorized.

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- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
 - 1. Material stored prior to previous report and remaining in storage.
 - 2. Material stored prior to previous report and since removed from storage and installed.
 - 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.10 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
 - 1. Submit unusual event reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

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

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
8. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

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

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include

additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Submittals shall be scheduled in an orderly fashion that spreads the submissions out over a period of time to permit Architect adequate opportunity to schedule personnel for timely reviews. Where submittals are not required to be submitted concurrently, or do not require coordination with other submittals, Contractor shall review, stamp, and submit as submittals are received. Contractor shall not receive submittals, hold them, and then release them to the Architect all at once.
3. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
4. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
5. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.4 SUBMITTAL FORMATS

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

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 - a. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., ABCD-061000.01). Resubmittals shall

include an alphabetic suffix after another decimal point (e.g., ABCD-061000.01.A).

8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
 16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number. The only exception to this is the color charts which will be sent as hard copies in the mail. No photo copies or PDF copies of color charts will be acceptable.

1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Email: Prepare submittals as PDF package and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
- B. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings may be provided by Architect for Contractor's use in preparing submittals. Contact Architect for information.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 - a. Sitework submittals.
 - b. Commercial equipment submittals.
 - c. Structural submittals.
 - d. Mechanical submittals.
 - e. Electrical submittals.
 - f. Data & Communications Systems submittals.
 5. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
 6. Submittals with color selection: The Contractor shall deliver to Architect a list of submittals for the interior color package and a list for the exterior color package. The Contractor shall deliver all items for exterior color selection at one time. The Architect needs to coordinate the colors of all exterior items and the Contractor shall allow 4 weeks for return of exterior color selections. The Contractor shall deliver all items for interior color selection at the same time. The Architect needs to coordinate the colors of all interior items and the Contractor shall allow 6 weeks for return of interior color selections. PDF's or copies of manufacturer color charts are not allowed.
- E. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

- F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- G. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable. Mark with dark colored pen that permits photocopying.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Manufacturer's Safety and Data Sheets (MSDS).
 - h. Notation of coordination requirements.
 - i. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.

- f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
- 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 - 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.
 - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 - 5. Samples for Initial Selection: Submit manufacturer's hard copy color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available. Copies of color charts will not be reviewed and any submittal that includes copies will be rejected and count as one of two allowed submittals per section.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 - 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

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- 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- F. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- G. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed

before installation of product, for compliance with performance requirements in the Contract Documents.

5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.7 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file or three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
 1. The Contractor shall review submittals for completeness and compliance with the Contract Documents. If submittal contains substitutions, Contractor shall process substitutions in accordance with Section 012500 "Substitution Procedures," and not part of specified Shop Drawings or Product Data submittals. Contractor is responsible for keeping Subcontractors on time with the submittal schedule. If the Contractor submits submittals that are repeatedly rejected, requiring the Architect to perform multiple

reviews of the same submittal because of the failure to properly prepare and complete the submittals.

- a. Owner will compensate Architect for such additional services.
 - b. Owner will deduct the amount of such compensation from the final payment of the Contractor.
- B. Contractor Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
1. Stamp or statement shall include the following: "The Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents."
- C. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return. Architect will indicate, via markup on each submittal, the appropriate action.
1. The Architect's marking of "Approved," "Approved As Noted" or similar verbiage means submittal has been reviewed for general conformance to the Contract Documents only and does not mean unqualified acceptance. The Contractor is fully responsible for compliance with the Contract Documents.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Requirements:
 - 1. Section 012100 "Allowances" for testing and inspecting allowances.

1.2 DEFINITIONS

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

dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 2. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" shall have the same meaning as the term "testing agency."
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- E. Reports: Prepare and submit certified written reports and documents as specified.
- F. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 - 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

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

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged in the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
 - 1. Provide test specimens representative of proposed products and construction.
 - 2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - 4. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 10. Demolish and remove mockups when directed unless otherwise indicated.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.

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4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

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7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.
 1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
 2. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated on structural notes sheet S-0, and as follows:
 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections, and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.

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2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

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

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- J. Substantial Completion: The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use. Minor corrections and repairs that can be performed while the Owner has occupied the building and without undue annoyance to personnel will be acceptable under the definition of Substantial Completion. It shall also include major final cleaning required under the Contract, removal of all surplus equipment and material not required for completion or remaining work, and the placement of remaining materials and equipment in convenient locations as approved by the Owner.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
 - 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
 - 1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 - 2. ICC - International Code Council; www.iccsafe.org.
 - 3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
 - 1. COE - Army Corps of Engineers; www.usace.army.mil.
 - 2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
 - 3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
 - 4. DOE - Department of Energy; www.energy.gov.
 - 5. EPA - Environmental Protection Agency; www.epa.gov.
 - 6. FG - Federal Government Publications; www.gpo.gov/fdsys.
 - 7. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
 - 8. OSHA - Occupational Safety & Health Administration; www.osha.gov.
 - 9. SD - Department of State; www.state.gov.
 - 10. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.

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11. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
 12. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
 13. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
 14. USPS - United States Postal Service; www.usps.com.
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. USAB - United States Access Board; www.access-board.gov.
 2. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. MDEP - State of Maine Department of Environmental Protection.
 2. MDOT - State of Maine Department of Transportation

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Section 012100 "Allowances" for allowance for metered use of temporary utilities.

1.2 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- D. Heating Fuel:
 - 1. Fuel for use with the existing heating system will be provided and paid by the Owner. Owner will be responsible to heat Office areas of the building.
 - 2. Fuel required for temporary heating will be the responsibility of the Contractor. Contractor will be responsible to heat the renovation areas of the building.
- E. Telephone Service: Pay installation, service and use charges for telephone usage, by Contractor, at Project site.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

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- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.
- G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements to protect install concrete and masonry.

1.4 QUALITY ASSURANCE

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

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1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Frost Protection: Protect footings and slabs from freezing temperatures and prevent frost from occurring beneath footings and slabs. Frozen water found on soil or concrete surface shall be reason for rejection of protection method. Provide corrective measures within 24 hours after notice of condition is given. Evidence of frost at these locations shall be reason for rejection, removal, and replacement at no additional cost to the Owner.
- C. Use of new heating or cooling systems, during the construction period, will not be allowed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts.
 - 1. Privacy Screen: Provide heavy-duty fabric screen designed for chain link fencing. Provide 5'-9" wide for 6 foot high fencing.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry."
- C. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.
- D. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.
- E. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum 36 by 60 inches.
- F. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

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1. Furniture required for Project-site documents, including file cabinets, plan tables, plan racks, and bookcases.
 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
 3. Drinking water and private toilet.
 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
 5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control. Heaters shall be located outside the building and combustion gases shall be vented outside the building. Maintain observation of units in operation.
1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

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

3.2 INSTALLATION, GENERAL

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

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.
 - a. Refer to Divisions 02 through 48 for additional temporary heat, ventilation, and humidity requirements for products in those Sections.”
 - 2. Provide temporary heat to protect all concrete and masonry work during installation as well as other trades needing specific heat requirements to perform and protect their work. See individual specification sections for detailed information.
 - 3. All concrete slabs on grade, footings and foundations not below the frost line shall be protected from freezing either by heating or protecting with insulation until substantial completion.

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- F. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete. Route ductwork from the negative-air fans to the exterior of the building, filtering the air in the duct prior to being discharged, by means of a standard furnace air filter. The negative air pressure system shall be activated prior to the commencement of work each day, and remain operating until one-half hour after the stop of work for each day.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- H. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
 - 2. All spaces shall be mechanically ventilated to protect occupants from application and installation of odor causing materials. The area where odor-causing material is being used shall be isolated from the new and existing ventilation system.
 - 3. Negative pressure shall be maintained within the construction areas inside the existing building to prevent the spread of dust and odors. Route ductwork from the negative-air fans to the exterior of the building, filtering the air in the duct prior to being discharged, by means of a standard furnace air filter. The negative air pressure system shall be activated prior to the commencement of work each day, and remain operating until one-half hour after the stop of work for each day.
 - 4. No work creating fumes shall be done in occupied areas of existing building while it is occupied by the Owner. Ventilation shall be maintained for a period of 24 hours or until release of fumes has subsided, whichever is longer.
 - 5. The permanent ventilation system shall be fully operational and run full time for a minimum of 2 weeks before date established for Substantial Completion. Cost of operation shall be included as part of the work.
- I. Electric Power Service: Refer to Division 26 for requirements.

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- J. Lighting: Refer to Division 26 for requirements.
- K. Telephone Service: Provide temporary cellular telephone service with voice mail throughout construction period.
- L. At each Field Office, post a list of important telephone numbers.
 - 1. Police and fire departments.
 - 2. Ambulance service.
 - 3. Contractor's home office.
 - 4. Contractor's emergency after-hours telephone number.
 - 5. Architect's office.
 - 6. Engineers' offices.
 - 7. Owner's office.
 - 8. Principal subcontractors' field and home offices.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
 - 1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
 - 2. Utilize designated area within existing building for temporary field offices.
 - 3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- D. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
 - 1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated. Include name of project, and names of Owner, Architect and Contractor.

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2. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in size of 4 by 8 feet and 3/4 inch thickness, unless otherwise indicated. Support on posts or framing of preservative-treated wood or steel.
 3. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
 4. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 5. Maintain and touch up signs, so they are legible at all times.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- G. Temporary Elevator Use: Use of elevators is not permitted.
- H. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- I. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.
- J. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

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- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
- G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
 - 1. Install barricades (e.g. jersey barriers or heavy-duty moveable chain link fencing) along street-side open edges for protection of pedestrians.
- I. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- K. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard, with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 - 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 4. Insulate partitions to control noise transmission to occupied areas.
 - 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 6. Protect air-handling equipment.
 - 7. Provide walk-off mats at each entrance through temporary partition.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.

2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary heating system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

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- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 015526 – TRAFFIC CONTROL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Provide all materials and perform all work necessary to completely regulate traffic in the area of work. Work shall comply with Section 652 Maintenance of Traffic of the MDOT Standard Specifications, except for payment procedures. For roads not under the jurisdiction of MDOT, the Owner shall assume the role of the Department with regard to authorization or submissions.
- B. Perform all work in such a manner as to provide safe passage at all times for the public and with a minimum of obstruction to traffic.
- C. Do not close roads or streets to passage of the public without the permission of the proper authorities.
- D. The local police department and the Maine Department of Transportation will decide if safe passage is being maintained and shall have the authority to require the Contractor to take any additional steps necessary to maintain safe passage.
- E. The Contractor shall prepare and submit for approval, a Traffic Control Plan which explains and details the proposed method for traffic control. The Traffic Control Plan shall meet the requirements outlined in Sections 652.3.3 of MDOT Standard Specifications. The Owner and MDOT shall review the plan and must approve it prior to the start of work.

1.2 SCHEDULING WORK

- A. Schedule all work so that streets are not closed to passage by the public at any time.
- B. Revise the plan of work if it will create a traffic hazard or an unreasonably long detour.
- C. Do not start work in any new location without the permission of the Engineer.
- D. Notify all police and fire departments of all schedule detours and when streets are reopened.
- E. No detours shall remain after normal working hours without special written permission from the Owner.
- F. Traffic may not be stopped for more than 10 minutes at any time. At least one lane of traffic shall be maintained at all times

MOUNT DESERT FIRE DEPARTMENT – STATION #1

PART 2 - PRODUCTS

2.1 WARNING SIGNS AND BARRICADES

- A. Provide adequate warning signs, barricades and signal lights in accordance with Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) as published by US Department of Transportation. Also take other necessary precautions for the safety of the public.
- B. Provide and illuminate suitable warning signs to show where construction, barricades or detours exist.
- C. Provide barricades of substantial construction and painted with a finish that increases visibility at night.
- D. Keep signal lights illuminated at all barricades and obstructions from sunset to sunrise.
- E. Maintain all necessary signs, barricades, lights, watchmen and other safety precautions during authorized suspension of the work, weekends, holidays or other times when the work is not in progress.

PART 3 - EXECUTION

3.1 DETOURS

- A. Provide, identify and maintain suitable detours when the project, or any part thereof, is closed to public travel. When the closed part of the project is reopened, restore the detour area and any other disturbed areas to the original condition.
- B. Whenever a traveled way is closed, perform the work in such a manner that local travel and residents in the vicinity of the work will be inconvenienced as little as possible. Allow access to residents and abutting land owners along the project to driveways and other normal outlets from their property.

3.2 FLAGGERS

- A. The Contractor shall furnish flaggers where equipment and/or construction activity interfere with the movement and safety of the traveling public. This includes locations where equipment enters, leaves, or crosses, normal traffic lanes and locations where heavy equipment is operating adjacent to or within areas where traffic is moving. Flaggers shall be used primarily in areas of localized construction for directing traffic around hazards created by construction equipment.
- B. Flaggers shall meet the requirements of Section 652.4 of MDOT Standard Specifications, except that on roads which are not under the jurisdiction of MDOT, the flaggers shall not be required to meet the certification requirements of 652.4. Certification shall be required for roads under the jurisdiction of MDOT.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- C. Hand signaling devices shall conform to, and flaggers shall conduct themselves in accordance with the following:
1. Flags used for signaling shall be minimum of 24" x 24" in size and made of bright red material securely fastened to a staff approximately 3 feet long.
 2. Sign paddles shall be at least 15 " wide, with bold lettering at least 5" high. The stop face shall be red background with white letters. The GO face shall be dark green background with white letters. If SLOW is used instead of STOP the face shall be highway yellow background with black letters.
 3. In addition to the above qualifications, flaggers should possess the following minimum qualifications:
 - a. Average intelligence
 - b. Good physical condition, including sight and hearing.
 - c. Mental alertness
 - d. Courteous but firm manner
 - e. Neat appearance
 - f. Pleasing personality
 - g. Sense of responsibility for safety of public and crew.

END OF SECTION 01 55 26

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
 - 2. Section 012100 "Allowances" for products selected under an allowance.
 - 3. Section 012300 "Alternates" for products selected under an alternate.
 - 4. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 5. Section 014200 "References" for applicable industry standards for products specified.
 - 6. Section 01770 "Closeout Procedures" for submitting warranties.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.

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- D. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."
- E. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
 - 3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.
- C. Products with asbestos: Asbestos containing materials are not to be purchased or installed in this project.

1.4 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:

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

D. During the construction process, meet or exceed the following minimum requirements to prevent the growth of mold and bacteria:

1. Keep building materials dry. Wood, porous insulation, paper, fabric, and similar absorptive materials shall be kept dry to prevent the growth of mold and bacteria. Cover these materials to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials.
2. Replace water-damaged materials, or dry within 24 hours, due to the possibility of mold and bacterial growth. Materials that are damp or wet for more than 24 hours shall be discarded if evidence of mold occurs.
3. Immediately remove materials showing signs of mold and mildew, including materials with exposed moisture stains, from the site and properly dispose of them. Replace moldy materials with new, undamaged materials.
4. Require that moisture sensitive materials be delivered dry and protected from the elements.
5. Allow for time in the construction schedule for materials to dry before they are enclosed.

1.6 PRODUCT WARRANTIES

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

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1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved substitute" or approved," comply with provisions in "Product Substitutions" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

- a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comply with requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed product.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comply with requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed product.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and

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other characteristics that are based on the product named. Comply with requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed product or manufacturer.

- a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.
1. Select products for which sustainable design documentation submittals are available from manufacturer.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Cutting and patching.
 - 3. Coordination of Owner's portion of the Work.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.

- B. Related Requirements:
 - 1. Section 011000 "Summary" for coordination of Owner-furnished products, Owner-performed work, and limits on use of Project site.
 - 2. Section 013300 "Submittal Procedures" for submitting surveys.
 - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
 - 4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
 - 5. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting

- and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Plumbing piping systems.
 - f. Mechanical systems piping and ducts.
 - g. Control systems.
 - h. Communication systems.
 - i. Fire-detection and -alarm systems.
 - j. Conveying systems.
 - k. Electrical wiring systems.
 - l. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.

4. Recommended corrections.

- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb, and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

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- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Anchors and Fasteners: provide anchors and fasteners and required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: where mounting heights are not indicated, mount components at heights directed by Consultant.
 - 2. Allow for building movement, including thermal expansion and contraction and acoustic isolation between construction systems (AIC and AIJ).
 - 3. Coordinate installation of anchorages. Furnishes setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
 - 4. Provide metal fastenings and accessories in same texture, color and finish as adjacent materials, unless otherwise indicated.
 - 5. Prevent electrolytic action between dissimilar metal and materials.
 - 6. Space anchors within their load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
 - 7. Keep expose fastenings to a minimum, space evenly and install neatly.
 - 8. Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.
 - 9. Use non-corrosive, hot-dipped galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the affected specification section.
- I. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- J. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.
- K. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.4 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as

practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.
1. Provide temporary facilities required for Owner-furnished, Contractor-installed and Owner-furnished, Owner-installed products.
 2. Refer to Section 011000 "Summary" for other requirements for Owner-furnished, Contractor-installed and Owner-furnished, Owner-installed products
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Preinstallation Conferences: Include Owner's construction personnel and Owner's separate contractors at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.6 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
 - a. Clean interior spaces prior to the start of finish painting, and continue cleaning on an as-needed basis until painting is finished.
 - b. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.
 3. Remove materials and debris that create tripping hazards.
- D. For general construction, each trade shall pick up the debris and rubbish, generated by that trade, and dispose of in dumpsters furnished by the General Contractor.
- E. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- G. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

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- H. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

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

3.8 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.
- E. Protect resilient flooring against marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.
 - 1. Cover products installed on floor surfaces with undyed, untreated building paper until inspection for Substantial Completion.

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2. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- F. Protect roofing materials against cuts, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period.
1. Do not move heavy and sharp objects directly over roof surfaces. Place plywood or hardboard panels over roofing and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- G. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification. Replace or repair damaged labels to Architect's satisfaction or replace component if label cannot be repaired or replaced.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Recycling nonhazardous demolition and construction waste.
 - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
 - 1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Salvage/recycle as much percent by weight as possible of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:

- a. Asphaltic concrete paving.
- b. Concrete.
- c. Concrete reinforcing steel.
- d. Concrete masonry units.
- e. Wood studs.
- f. Wood joists.
- g. Plywood and oriented strand board.
- h. Wood trim.
- i. Structural and miscellaneous steel.
- j. Roofing.
- k. Insulation.
- l. Doors and frames.
- m. Door hardware.
- n. Windows.
- o. Glazing.
- p. Gypsum board.
- q. Cabinets.
- r. Piping.
- s. Supports and hangers.
- t. Valves.
- u. Sprinklers.
- v. Mechanical equipment.
- w. Electrical conduit.
- x. Copper wiring.
- y. Switchgear and panelboards.

2. Construction Waste:

- a. Site-clearing waste.
- b. Masonry and CMU.
- c. Lumber.
- d. Wood sheet materials.
- e. Wood trim.
- f. Metals.
- g. Roofing.
- h. Insulation.
- i. Gypsum board.
- j. Piping.
- k. Electrical conduit.

1. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

PART 3 - EXECUTION

3.1 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

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

3.2 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 1. Clean and stack undamaged, whole masonry units on wood pallets.

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- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- H. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- I. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- J. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.
- K. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- L. Conduit: Reduce conduit to straight lengths and store by type and size.

3.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees at landfill facility.
- C. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- D. Paint: Seal containers and store by type.

3.4 DISPOSAL OF WASTE

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

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
 - 2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.3 ACTION SUBMITTALS

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

1.4 CLOSEOUT SUBMITTALS

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

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- C. Field Report: For pest-control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit sustainable design submittals not previously submitted.
 - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.

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5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- C. One Year Warranty Inspection: One month prior to the one year anniversary of final completion a site walk-thru shall be completed by the owner and contractor. Items requiring work and covered by warranty shall be fixed within 30 days of the walk-thru. At the

completion of any/all work required to be done under warranty, a release of retainage shall occur. If the contractor, for whatever reason, fails to complete the items specified during the walk-thru the owner shall use the retained monies to complete the work to his satisfaction, with any monies left over being paid to the contractor.

1.8 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. PDF Electronic File: Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
1. Unless indicated otherwise, all warranties shall commence on the date of Substantial Completion.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
1. Submit by email to Architect.

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- E. Provide additional copies of each warranty to include in operation and maintenance manuals.
- F. Warranty Response Time: The Contract shall respond and begin to take necessary action within 7 days of receipt of written notification from the Owner. Response time for life safety items, and for building perimeter security shall be within 24 hours of receipt of written notification from the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - i. Vacuum and mop concrete.

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- j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - k. Resilient flooring shall be scrubbed and cleaned with cleaner recommended by the flooring manufacturer just prior to occupation by Owner. No-wax floors shall be cleaned and buffed in accordance with flooring manufacturer's requirements.
 - l. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces. Cleaning of windows shall be done just before Owner occupancy.
 - m. Remove labels that are not permanent.
 - n. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
 - r. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - s. Clean strainers.
 - t. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit by email to Architect. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

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- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor or Construction Manager.
 - 6. Names of primary subcontractors.
 - 7. Name and contact information for Architect.
 - 8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 9. Cross-reference to related systems in other operation and maintenance manuals.

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- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
 - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 - 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.7 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Emergency operations and shutdown information that must be immediately available during emergency situations to protect life and property and to minimize disruptions to building occupants.
- C. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- D. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

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1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

E. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

F. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

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1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

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

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent,

and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

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- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

- 1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
 - 5. Directories.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for final property survey.
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

- A. Submit all project record documents as one submittal package.
- B. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
- C. Record Specifications: Submit annotated PDF electronic files or one paper copy of Project's Specifications, including addenda and Contract modifications.
- D. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- E. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- F. Reports: Submit written report monthly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.

3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- B. Format: Submit record specifications as annotated PDF electronic file or paper copy.

1.5 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
- C. Format: Submit Record Product Data as annotated PDF electronic file.
 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

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1.6 DIRECTORIES

- A. Directories: Contractor/Subcontractor directory.
 - 1. Submit one hard copy and one copy on USB storage device in PDF format.
- B. Directory: Name, address and telephone number for General Contractor, all major subcontractors, organized by specification section. Provide a separate list in alphabetical order.

1.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.

1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.4 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.5 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
 - 1. Motorized doors, including overhead coiling doors and automatic entrance doors.
 - 2. Fire-protection systems, including fire alarm fire pumps and fire-extinguishing systems.
 - 3. Intrusion detection systems.
 - 4. Conveying systems, including elevators.
 - 5. Heat generation, including boilers pumps and water distribution piping.
 - 6. Refrigeration systems, including condensers pumps and distribution piping.
 - 7. HVAC systems, including air-handling equipment air distribution systems and terminal equipment and devices.
 - 8. HVAC instrumentation and controls.
 - 9. Electrical service and distribution, including transformers switchboards panelboards uninterruptible power supplies and motor controls.
 - 10. Lighting equipment and controls.
 - 11. Communication systems, including intercommunication clocks and programming voice and data and television equipment.

- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.

 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.
 - e. Project Record Documents.
 - f. Identification systems.
 - g. Warranties and bonds.
 - h. Maintenance service agreements and similar continuing commitments.

 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.

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- b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
- a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.

- e. Review of spare parts needed for operation and maintenance.

1.6 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.7 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner, through Architect, with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, a written or a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.8 DEMONSTRATION AND TRAINING SCHEDULE

- A. Demonstration of equipment includes, but is not limited to, the following:
 - 1. Overhead sectional doors.
 - 2. Elevator.

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- B. Demonstration and training with video recording of equipment includes, but is not limited to, the following:
1. HVAC equipment and systems.
 2. Electrical equipment and systems.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.
3. Temporary dust and sound partitions.
4. Temporary ventilation.
5. Repair procedures for selective demolition operations.
6. Patching and repairs.
7. Coordination with Owner for renovations adjacent to existing occupied spaces.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

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1.4 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.5 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. All air-handling ducts shall be shut down or covered whenever possible during demolition activities. This covering or shut down of air-handling ducts shall be approved by the Owner prior to modifying existing conditions.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.

3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Flooring Protection:
 - a. At existing buildings where existing flooring is to remain, cover flooring with protection board that will prevent damage from construction activities, including moving of equipment and lifts, metal cuttings from steel cutting and threading operations, oils and fluids that could discolor flooring, water, construction worker traffic and activities.
 5. Cover and protect furniture, furnishings, and equipment that have not been removed.
 6. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures and provide exhaust ventilation to limit dust and dirt migration and to separate areas from fumes and noise. Coordinate requirements with Section 015000 – Temporary Facilities and Controls.

- C. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- D. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain fire watch during and for at least 24 hours after flame-cutting operations.
 - 6. Maintain adequate ventilation when using cutting torches.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 9. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site.
 - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:

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1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- F. Carpet Floor Coverings: Remove floor coverings and adhesive according to recommendations of new carpet manufacturer for adhered application. Do not use methods requiring solvent-based adhesive strippers.
- G. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 074113.16 "Standing Seam Metal Roof Panels for new roofing requirements.
1. Remove existing roof membrane, flashings, copings, and roof accessories.
 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
1. Do not allow demolished materials to accumulate on-site.

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2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.9 SELECTIVE DEMOLITION SCHEDULE

A. Remove: Selective removals as indicated on the drawings.

B. Remove and Salvage:

1. Salvage existing 80KW/80KVA diesel generator and 400A automatic transfer switch.
2. Salvage existing electrical service wiring.
3. Remove, transport and unload the Generator at 307 Sargent Drive.

C. Remove and Reinstall:

1. Salvage existing interior doors and frames for re-use.
2. Salvage existing overhead doors for re-use.
3. Salvage existing windows for re-use.
4. Salvage existing laundry evacuator for reuse.
5. Salvage existing utility sink for reuse.
6. Salvage all existing lockers, metal shelving and metal/plastic cabinets for reuse.
7. Salvage existing hydronic unit heaters for reuse.

END OF SECTION 024119

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: concrete mix designs and reinforcement types
- B. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.
- C. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; ACI 318 "Building Code Requirements for Structural Concrete", ACI 302 "Guide for Concrete Floor and Slab Construction", ACI 305 "Recommended Practice for Hot Weather Concreting", ACI 306 "Recommended Practice for Cold Weather Concreting", ACI 308 "Guide to Curing and CRSI's "Manual of Standard Practice."
- D. Comply with MDOT Standard Specifications for concrete work associated with sidewalks.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain Steel Wire: ASTM A 82, where noted.
- C. Welded wire reinforcement shall be manufactured from domestic steel without foreign steel or billets used in the manufacturing process if the project is Federally funded or requires "buy American" clauses be met.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet. Deformed welded wire reinforcement shall have a minimum yield strength of 80,000 psi.
- E. Portland Cement: ASTM C 150, Type I or II.
- F. Fly Ash: ASTM C 618, Type C or F.
- G. Aggregates: ASTM C 33, uniformly graded.
- H. Synthetic Fiber: ASTM C 1116, Type III, polypropylene fibers, 1/2 to 1-1/2 inches long.
- I. Air-Entraining Admixture: ASTM C 260.
- J. Chemical Admixtures: ASTM C 494, water reducing, high-range water reducing, water reducing and accelerating, and water reducing and retarding as required. Do not use calcium chloride or admixtures containing calcium chloride.

- K. Vapor barrier shall have all of the following qualities:
 - 1. Maintain permeance of less than 0.01 Perms [grains/(ft² · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
 - 2. Other performance criteria:
 - a. Strength: ASTM E1745 Class A.
 - b. Thickness: 15 mils minimum
 - c. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1
 - 3. Vapor barrier products:
 - a. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.
 - 4. Sealing penetrations, perimeter/edge seal per manufacturers recommendations.
- L. Slab perimeter joint filler: 1/4" thick polyethylene, closed-cell expansion joint filler (Deck-O-Foam), with pre-scored removable strip to provide a uniform sealing reservoir in the joint, by W. R. Meadows.
- M. Perimeter and Under Slab Insulation: Rigid, Foamular 250, extruded polystyrene insulation board as manufactured by Owens Corning or approved equal.
- N. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- O. Wall Sealer Compound: Cold-applied, emulsified-asphalt damproofing as manufactured by Desgussa Building Systems; Sonneborn Brand Products, Karnak Corporation or W.R. Meadows Inc. Acceptable products include:
 - 1. Sealmastic, Type 1; W. R. Meadows
 - 2. Hydrocide 600; Sonneborn Building Products.
 - 3. Karnak 100 AF; Karnac Chemical Corp.
- P. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A. Curing shall not impair bonding of any material to be applied directly to the concrete.
- Q. Resilient caulk for control joints and expansion joints: Non-priming one component polyurethane sealant as manufactured by Sonneborn or equal.
- R. PVC Waterstop: Provide flexible PVC (polyvinyl chloride) waterstop as indicated on drawings. Manufacturer shall be Greenstreak or approved equal.
 - 1. Waterstop shall be extruded from an elastomeric plastic material of which the basic resin is prime virgin PVC. The PVC compound shall not contain any scrapped or reclaimed material or pigment.
 - 2. Waterstop shall be installed in strict accordance with manufacturer's instructions. Corners, tees and other joint configurations shall be assembled using pre-fabricated pieces supplied by the same manufacturer and intended for the proposed application. Segments of waterstop shall be field-joined as required using manufacturer-approved tools and procedures.
 - 3. Performance requirements as follows:

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Property	Test Method	Required Limits
Water absorption	ASTM D 570	0.15% max
Tear Resistance	ASTM D 624	300 lb/in (52.5 kN/m) min.
Ultimate Elongation	ASTM D 638	350% min.
Tensile Strength	ASTM D 638	2000 psi (13.78 Mpa) min.
Low Temperature Brittleness	ASTM D 746	No Failure @ -35° F (-37° C)
Stiffness in Flexure	ASTM D 747	700 psi (4.82 Mpa) min.
Specific Gravity	ASTM D 792	1.38 max.
Hardness, Shore A	ASTM D 2240	79 +3
Tensile Strength after accelerated extraction	CRD-C 572	1600 psi (9.54 Mpa) min.
Elongation after accelerated extraction	CRD-C 572	300% min.
Effect of Alkalies after 7 days: Weight Change Hardness Change	CRD-C 572	between -0.10% / +0.25% +/- 5 points

- S. Wall Penetrations: Where noted on plan, synthetic rubber interlocking link seals for hydrostatic sealing of annular space between pipes and concrete walls, floors and casings, with cast-in-place wall sleeve.
1. Manufacturers: Link-Seal or equal.
 - a. 8” Pipe: Link Seal model LS-475, or as noted on plans; with CIP non-metallic or steel wall sleeve.

2.2 MIXES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
 1. Minimum Compressive Strength: Minimum 28 day strength shall be 4000 psi for slabs on grade, sidewalks, foundation walls and footings; and 3000 psi other applications unless otherwise noted on plans.
 2. Maximum Water-Cementitious Materials Ratio: 0.45
 3. Slump Limit: 4 inches or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
 4. Air Content: Maintain within range permitted by ACI 301, generally between 5 to 7%. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.
- C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116.
 1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 CONCRETING

- A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, 1/8 inch for concrete exposed to view and Class C, 1/2 inch for other concrete surfaces.

- B. Install vapor barrier in accordance ASTM E1643.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
 - 2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
 - a. Seal vapor barrier to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, or both Stego Term Bar and StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.
 - 3. Overlap joints 6 inches and seal with manufacturer's seam tape.
 - 4. Apply seam tape/Crete Claw to a clean and dry vapor barrier.
 - 5. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 6. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
 - 7. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.
 - 8. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
- C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- D. Install construction, isolation, and contraction joints where indicated. Install full-depth joint-filler strips at isolation joints. Where no joints are indicated the following shall be considered minimum:
 - 1. Construction joints shall be placed such that no single placement exceeds 60 linear feet of wall.
 - 2. Slabs-on-grade: Saw out joints in slabs where indicated on Drawings or at a minimum spacing of 20' in each direction. Cut to be a depth of "t/4", where t equals the slab thickness in inches, and as narrow as possible, within 48 hours of finishing, to a true straight line.
- E. Construction joints shall be formed with keyed bulkheads. Reinforcement shall continue through the joint and additional reinforcement placed as required.
- F. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.
- G. Concrete shall be deposited continuously, in horizontal layers of such thickness (not deeper than 18") that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. Placing integrated with fresh concrete is still plastic. Concrete which has partially hardened or has been contaminated for foreign materials shall not be deposited. No horizontal construction joints will be allowed in foundation walls.
- H. Concrete shall be compacted thoroughly by vibrating to produce a dense, homogeneous mass without voids or pockets. Vibrators should be placed in concrete rapidly to penetrate

approximately 3" to 4" into the preceding lift to blend the two layers. Vibrating techniques must assure that when the coarse aggregate reaches the form, it stops and the matrix fills the voids

- I. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.
- J. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.
- K. Slab Finishes: Comply with ACI 302.1R for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:
 - 1. Scratch finish for surfaces to receive mortar setting beds.
 - 2. Float finish for interior steps and ramps and surfaces to receive waterproofing, roofing, or other direct-applied material.
 - 3. Flat rubbed, float or light steel troweled finish for floor surfaces to receive cementitious urethane coatings.
 - 4. Troweled finish for floor surfaces to receive floor coverings, paint, or other thin film-finish coatings.
 - 5. Trowel and fine-broom finish for surfaces to receive thin-set tile.
 - 6. Nonslip-broom finish to exterior concrete platforms, steps, sidewalks and ramps.
- L. Cure formed surfaces by moist curing for at least seven days.
- M. Begin curing concrete slabs after finishing. Keep concrete continuously moist for at least seven days or apply membrane-forming curing compound to concrete.
- N. Contractor shall engage an independent testing agency acceptable to the Owner to perform field tests and to submit test reports and will provide the results of such tests to the Engineer. The Contractor shall pay for such testing by allowance, as described in the contract documents. Unless otherwise arranged by Owner and Engineer, testing shall include the following:
 - 1. Field tests (including but not limited to tests of slump, air content and temperature) shall be performed for each concrete placement.
 - 2. A set of at least (4) cylinders shall be taken for each concrete placement for walls and slabs and lab-tested for strength at 7, 21, and 28 days.
 - 3. Re-testing materials that fail to meet the requirements of the contract documents shall be paid for by the Contractor.
- O. Contractor shall notify the Engineer at least 48 hours prior to each placement. No concrete shall be placed until the Engineer has inspected the forms, reinforcement, inserts, sleeves or other work to be built into the concrete and has approved such.
- P. Protect concrete from damage. Repair surface defects in formed concrete and slabs.
- Q. Formwork for walls and other parts not supporting the weight of the concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal operations but must remain a minimum of three days after the placement of the concrete.
- R. No live loads shall be allowed on slabs until the concrete has reached the specified 28-day strength, unless approved in writing by the Engineer.

- S. Splicing of bars and details not covered herein shall be in accordance with the recommendations of "Manual of Standard Practice for Detailing Reinforced Concrete Structures" ACI 315.

3.2 COLD WEATHER CONCRETING

- A. Concreting which occurs in cold weather shall comply with ACI 306 "Cold Weather Concreting", latest revision. ACI 306 states "Cold weather is defined as a period when, for more than 3 consecutive days, the following conditions exist:
 - 1. The average daily air temperature is less than 40° F, and
 - 2. The air temperature is not greater than 50° F for more than one-half of any 24-hr period.

The average daily air temperature is the average of the highest and the lowest temperatures occurring during the period from midnight to midnight."

- B. Concrete shall be protected from a single freezing cycle until it has attained a compressive strength of at least 500 psi.

3.3 HOT WEATHER CONCRETING

- A. Concreting which occurs in hot weather shall comply with ACI 305 "Hot Weather Concreting", latest revision.
- B. In hot weather (as defined in ACI 305), the contractor shall be prepared to protect the concrete from the adverse influence of heat on the placement and curing of concrete. Special precautions shall be taken to avoid cracking of the concrete from rapid drying when air temperatures exceed 70° F. For purposes of complying with ACI 305 the critical evaporation rate shall be considered to be 0.2 lb/ft²/hr.
- C. In hot weather slabs shall be wet cured.

3.4 SURFACE REPAIRS

- A. Remove all honeycombed and other defective concrete down to sound concrete. Dampen area to be patched and area around it to prevent absorption of water from patching mortar. Patching mixture shall be of same sand and cement as used in concrete so as to match color. Final patch shall be flush with finished surface and finished to match surrounding area.
- B. Wall ties shall be removed after form removal. Tie holes which shall be exposed shall be patched with mortar mix. Tie holes not exposed in the finished work may be filled with asphalt roofing cement, troweled into holes.

3.5 CONCRETE PENETRATIONS

- A. Holes required by various trades shall be cast with sleeves when the concrete is placed unless otherwise approved by the Engineer.

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- B. Holes required by various trades, and not receiving sleeves shall be cut using a core drilling process or sawing process which produces clean, sharp edges and minimum hole size which can accommodate the required piping, conduit or equipment. Holes shall not be “broken or knocked” through.
- C. All penetrations through concrete shall be made watertight and be clean and neat in appearance.
- D. Where noted on plans, use interlocking link seals between annular space around pipe and wall or wall sleeve. Install per manufacturer’s instructions.

3.6 INSTALLATION OF EMBEDDED ITEMS

- A. General: Supply and set into work, anchorage devices and other embedded items required for other work that is to be attached to or supported by cast-in-place concrete. Do not “wet stick” embedded items during and/or after concrete placement.

3.7 ACCEPTANCE

- A. Strength: Strength of concrete shall be considered satisfactory if the average of any five consecutive strength tests of the laboratory cured specimens representing each strength of concrete is equal to or greater than the specified strength and if not more than 20 percent of the strength tests have values less than specified.
- B. Strength: If inadequate specimens are available to determine strength then at least three cores shall be taken in accordance with ASTM C42 from the area in question. The location of such cores shall be determined by the Engineer and testing shall be done by an independent testing laboratory approved by the Engineer. The strength of cores from each member or area shall be considered satisfactory if their average is equal to or greater than 90% of specified strength. The Contractor shall pay for obtaining cores and testing by allowance, as described in the contract documents. If the testing determines the concrete to be less than satisfactory then the Contractor shall reimburse the Owner for such coring and testing. Core holes shall be plugged solid with grout.
- C. Work that meets the applicable requirements of 3.6.A or B above shall be accepted, with regard to strength.
- D. Concrete failing to meet the strength requirements of this section may be required to undergo additional curing as specified by the Engineer or may be required to be removed, at the discretion of the Engineer.
- E. Formed surfaces that are not within tolerances specified and/or inaccurately formed surfaces exposed to view will be rejected and shall be removed and replaced.
- F. Concrete exposed to view with defects which adversely affect the appearance of the structure may be repaired if possible. If, in the opinion of the Engineer, the defects cannot be repaired, the concrete may be accepted or rejected in accordance with the decision of the Engineer.
- G. Concrete members cast in the wrong location may be rejected if the strength, appearance or function of the structure is adversely affected in the opinion of the Engineer.

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END OF SECTION 033000

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SECTION 033533 - SPECIAL CONCRETE FLOOR FINISHES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies the following:
 - 1. Single application cure-seal-hardener for new concrete floors.
 - 2. Single application sealer-hardener for existing concrete floors.
- B. Related Section:
 - 1. Cast-In-Place Concrete: Division 03 Cast-In-Place Concrete sections.

1.2 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Certificates: Manufacturer's certification that the installer is acceptable.
- C. Maintenance Data: Maintenance instructions, including precautions for avoiding staining after application.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
- C. Handling: Protect materials from dirt, corrosion, oil, grease and other contaminants.

1.4 PROJECT CONDITIONS

- A. Environmental limitations:
 - 1. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
- B. Close areas to traffic during floor application and after application, for time period recommended in writing by manufacturer.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Cure-Seal-Hardener: Ashford Formula, a water-based chemically reactive penetrating sealer and hardener that seals by densifying concrete so that water molecules cannot pass through but air and water vapor can, and allows concrete to achieve full compressive strength, minimizing surface crazing and eliminating dusting.
 - 1. Abrasion Resistance to Revolving Disks: At least a 32.5% improvement over untreated samples when tested in accordance with ASTM C779.
 - 2. Surface Adhesion: At least a 22% increase in adhesion for epoxy when tested in accordance with ASTM D3359.
 - 3. Hardening: As follows when tested in accordance with ASTM C39:
 - a. After 7 Days: An increase of at least 40% over untreated samples.
 - b. After 28 Days: An increase of at least 38% over untreated samples.
 - 4. Coefficient of Friction: 0.86 dry, 0.69 wet when tested in accordance with ASTM C1028.
 - 5. Rebound Number: An increase of at least 13.3% over untreated samples when tested in accordance with ASTM C805.
 - 6. Light Exposure Degradation: No evidence of adverse effects on treated samples when tested in accordance with ASTM G23.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Do not use frozen material. Thaw and agitate prior to use.
- D. If construction equipment must be used for application, diaper all components that might drip oil, hydraulic fluid or other liquids.

3.3 APPLICATION

- A. Compliance: Comply with manufacturer’s product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.
- B. All work must be performed by an applicator certified by the manufacturer. Certification credentials are required.
- C. New Concrete: Apply cure-seal-hardener to new concrete as soon as the concrete is firm enough to work on after troweling; with colored concrete, wait a minimum of 30 days before application.
 - 1. Spray on at rate of 200 ft²/gal.
 - 2. Keep surface wet with cure-seal-hardener for a minimum soak-in period of 30 minutes without allowing it to dry out or become slippery. In hot weather, slipperiness may appear before the 30 minute time period has elapsed. If that occurs, apply additional cure-seal-hardener as needed to keep the entire surface in a non-slippery state for the first 15 minutes. For the remaining 15 minutes, mist the surface as needed with water to keep the material in a non-slippery state. In hot weather conditions, follow manufacturer’s special application procedures.
 - 3. When the treated surface becomes slippery after this period, lightly mist with water until slipperiness disappears.
 - 4. Wait for surface to become slippery again, and then flush entire surface with water to remove all cure-seal-hardener residue.
 - 5. Squeegee surface completely dry, flushing any remaining slippery areas until no residue remains.
 - 6. Wet vacuum or scrubbing machines can be used in accordance with manufacturer’s instructions to remove residue.
- D. Existing Concrete: Apply cure-seal-hardener only to clean bare concrete.
 - 1. Thoroughly remove previous treatments, laitance, oil and other contaminants.
 - 2. Saturate surface with cure-seal-hardener; re-spray or broom excess onto dry spots.
 - 3. Keep surface wet with cure-seal-hardener for a minimum soak-in period of 30 - 40 minutes.
 - 4. If most of the material has been absorbed after the 30 minute soak-in period, remove all excess material, especially from low spots, using broom or squeegee.
 - 5. If most of the material remains on the surface after the 30 minute soak-in period, wait until the surface becomes slippery and then flush with water, removing all cure-seal-hardener residue. Squeegee completely dry, flushing any remaining slippery areas until no residue remains.
 - 6. If water is not available, remove residue using squeegee.

3.4 PROTECTION:

- A. Protect installed floors for at least 3 months until chemical reaction process is complete.
 - 1. Do not allow traffic on floors for 3 hours after application.
 - 2. Do not allow parking of vehicles on concrete slab.

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3. If vehicles must be temporarily parked on slab, place dropcloths under vehicles during entire time parked.
4. Do not allow pipe cutting using pipe cutting machinery on concrete slab.
5. Do not allow temporary placement and storage of steel members on concrete slabs.
6. Clean up spills immediately and spot-treat stains with degreaser or oil emulsifier.
7. Clean floor regularly in accordance with manufacturer's recommendations.

END OF SECTION 033536

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cutting and patching existing concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Masonry-joint reinforcement.
5. Miscellaneous masonry accessories.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
 1. Masonry units.
 - a. Include data on material properties AND material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Cementitious materials. Include name of manufacturer, brand name, and type.
 3. Mortar admixtures.
 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

5. Grout mixes. Include description of type and proportions of ingredients.
 6. Reinforcing bars.
 7. Joint reinforcement.
 8. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 year experience.
- B. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates or setting beds. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with the following requirements:
 - 1. Cold-Weather Construction: When the anticipated daytime low temperature is within the limits indicated, use the following procedures:
 - a. 40 to 32 deg F: Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F.
 - b. 32 to 25 deg F: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Heat masonry units to 40 deg F. Maintain mortar and grout above freezing until used in masonry. Use heat on both sides of walls under construction.
 - c. 25 to 20 deg F: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F.
 - d. 20 deg F and Below: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F.
 - 2. Cold-Weather Protection: When the anticipated daytime low temperature is within the limits indicated, coordinate with the General Contractor to provide the following protection. This is in addition to construction procedures specified above:

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- a. 40 to 32 deg F: Cover masonry with insulating blankets for 48 hours after construction.
 - b. 32 deg F and Below: Provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 72 hours after construction.
3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried out, but not less than 7 days after completion of cleaning.
- E. Hot-Weather Requirements: Coordinate with the General Contractor to protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C1314.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated.

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1. In addition to ASTM C90 requirements for defects in CMU units, do not install interior CMU units with defects larger than 1/4 inch, and defects visible from 5 feet away.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C90.
1. Density Classification: Normal weight unless otherwise indicated.
 2. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
 3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 4. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.5 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

- A. General: Mortar and grout may be provided in one of two options; field mix of Portland cement, lime and sand or with specified Portland Cement-Lime Mix.
- B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

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1. Available Products: Subject to compliance with requirements, available products include the following or approved substitute:
 - a. Lafarge: Eaglebond Portland and Lime, Type "S".
 - b. Ciment Quebec, Inc.: Portland and Lime / Type S.
 - c. Dragon Cement and Concrete: Type S Masonry Cement.
 - d. Quikrete: Portland and lime Quikrete.

E. Aggregate for Mortar: ASTM C144.

F. Aggregate for Grout: ASTM C404.

G. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

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

1. Available Products: Provide one of the following or approved substitute.
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: Mill- galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.
5. Spacing of Cross Rods: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet.

D. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

1. Available Products: Provide one of the following or approved substitute.
 - a. Dayton Superior Corporation, Dur-O-Wal Division; DA 320 Ladur.
 - b. Hohmann & Barnard, Inc.; #220 Ladder-Mesh.
 - c. Sandell: Ladder Reinforcement.
 - d. Wire-Bond; Series 200, Single Wythe.

2.8 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM 1064/A 1064M, with ASTM A153/A153M, Class B-2 coating.
 - 2. Galvanized-Steel Sheet: ASTM A653/A653M, Commercial Steel, G60 zinc coating.
 - 3. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
 - 4. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
 - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

2.9 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- B. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.
 - 1. Available Products: Provide one of the following or approved substitute.
 - a. Holmann & Barnard: #NS – Closed Cell Neoprene.
 - b. Sandell: Closed Cell Neoprene.
 - c. Wire Bond: 3000 Horizontal.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287,

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Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

2.11 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of 1/2-cup dry measure tetrasodium polyphosphate (Spic and Span) and 1/2-cup dry measure laundry detergent dissolved in 1 gal. of water.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime mortar unless otherwise indicated.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For reinforced masonry, use Type S.
 - 2. For interior nonload-bearing partitions, use Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.

4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 1. Mix units from several pallets or cubes as they are placed.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:

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

3.4 LAYING MASONRY WALLS

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

- J. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

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

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 - 1. Install preformed control-joint gaskets designed to fit standard sash block.
 - 2. Joint reinforcement shall be discontinuous at control joints.
 - 3. Structural bond beam reinforcement shall be continuous through control joints.

3.8 LINTELS

- A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.9 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches.

3.10 FIRESTOPPING

- A. Firestopping: Refer to Section 078443 “Joint Firestopping” for installation requirements. Provide firestopping, as part of the work of this section, at the top of fire-rated masonry walls between top of partition and underside of structure above, both for new and existing conditions. Where gypsum wallboard is installed at the top of rated existing masonry walls, the firestopping will be provided by others.

1. Bearing walls, not subject to vertical movement, may be grouted solid between top of wall and underside of structure, in lieu of firestopping.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to TMS 402/ACI 530/ASCE 5.
 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for compressive strength.
- F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
 2. Clean concrete masonry stains with job-mixed detergent solution by cleaning method indicated in NCMA TEK 8-2A and as applicable to type of stain on exposed surfaces.

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3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

3.13 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 05 10 00 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes furnishing all materials and labor related to the installation of all Structural steel and related work. Structural steel includes:

1. All structural steel including beams, columns, girders, column cap and base plates, bearing plates, angles, and channels
2. Design of structural steel connections.
3. Connection angles, bolts, and electrodes for welding work.
4. Framing for all openings in metal deck.
5. Framing and supports for roof top units.
6. Shop painting
7. Shop drawings
8. Furnishing anchor bolts
9. Connections of masonry components to structural steel components
10. Connections of steel joists and steel joist girders to structural steel
11. All other miscellaneous items required to provide a complete and thorough installation or product.

B. The work shall conform to the following standards:

1. AISC Specifications for Structural Steel Buildings, latest edition
2. AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts, latest edition
3. AISC Code of Standard Practice for Steel Buildings and Bridges, latest edition, with the following modification:

Paragraph 4.2.1 is modified by the deletion of the following sentence: "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as part of his preparation of these shop drawings."

4. Structural Welding Code – Steel, AWS (D1.1), latest edition

C. Related Work Specified Elsewhere - The following related work is to be performed under the designated Sections:

1. Section 061000 – Rough Carpentry

1.2 QUALITY ASSURANCE

A. Allowable Tolerances:

1. Manufacturing: Conform to limits established in ASTM A6

2. Erection: Conform to AISC "Code of Standard Practice for Steel Buildings and Bridges", latest edition.
- B. Shop Inspection: Shop fabrication of structural steel shall be open for inspection by Owner's Representative.
- C. Testing:
1. Testing of structural steel shall be performed by an independent testing agency selected and paid by Owner, and who is qualified in accordance with the American Society for Nondestructive Testing Recommended Practice. Cost of all retesting of deficient materials and installation shall be paid by Contractor.
 2. Testing agency shall perform the following testing (at Owner's option):
 - a. Verification of welder's qualifications and welding procedures and materials.
 - b. Visual and dimensional weld examinations
 - c. Upon request by the Engineer: Radiographic testing of welds in accordance with AWS D1.1. At least 10% of all butt joints, and groove welds shall be so tested.
 - d. Upon request by the Engineer: Ultrasonic testing of welds in accordance with AWS D1.1. At least 10% of all welds shall be so tested.
 - e. Testing of bolted connections in accordance with AISC "Specification for Structural Joints using ASTM A325 or A490 Bolts". At least 10% of connections shall be tested.

1.3 SUBMITTALS

- A. Shop drawings:
1. Shop drawings must be submitted to the Engineer prior to fabrication.
 2. Contractor is responsible for field measuring and verification of field measurements for items requiring such.
 3. Prepare in accordance with the applicable standards and specifications listed for this section.
 4. Shop drawings shall include complete details and schedules for fabrication and assembly of structural steel members. Details shall include: cuts, connections, camber, holes, welds and other related information. Welds shall be indicated by standard AWS symbols and show length, size and type of each weld. Furnish erection drawings referencing erection marks to shop detail drawing numbers. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorage. Types of fasteners shall be clearly shown for all members.
 5. The fabricator's engineer shall be responsible for the design, adequacy, and safety of all connections. All shop drawings shall be signed and sealed by the fabricator's engineer with the seal of the Registered Professional Engineer for the state where the structure is located. Sealed erection drawings shall show the design loads of the connections used for fabrication.
 - a. The fabricator's engineer shall utilize the requirements in the AISC Specifications and the Contract Documents and submit the Connections details to the Owner's Designated Representative for Design for approval.

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6. Review of submittals is only for review of general conformance to the design concept, including verification of connection design loads. The review shall in no case relieve the contractor of the responsibility for design, adequacy and safety of all connections, correctness of fit dimensions, quality or quantity of materials, or other conditions or performance.

- B. Mill Test Reports: Submit for rolled shapes, plates and bars. Indicate chemical and physical properties.
- C. Submit fabricator certification by special inspection agency and certificate of compliance or work as described in section 1704.2.2 of International Building Code.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store structural steel members at project site above ground on platforms or skids
- B. Protect items from corrosion affecting structural strength and use
- C. Store bolts and weld rods in original containers with labels intact.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Shapes and Plates:
 1. W Shapes: ASTM A992 (Fy= 50 ksi, Fu = 65 ksi) Typical, unless noted
 2. M, S Shapes: ASTM A36 or ASTM A572 Grade 50
 3. HP Shapes: ASTM A572 Grade 50
 4. Angles: ASTM A36
 5. Rectangular, round, and square HSS: ASTM A500, Grade B, Fy = 46 ksi
- B. Seamless Steel Pipe: Meeting ASTM A53, Type S, Grade B
- C. Unfinished bolts and nuts: Meeting ASTM A307, Grade A
- D. High strength bolts: Meeting ASTM A325, Type 1 or ASTM A490 if noted on drawings
- E. Nuts: Meeting ASTM A563 with appropriate grade and finish as specified per ASTM A563 Table X1.1 according to the bolt or threaded part with which the nut will be used.
- F. Washers: Washers shall be hardened steel meeting the requirements of ASTM F436.
- G. Welding electrodes: Meeting AWS D1.1
- H. Galvanized bolts shall be ASTM A325 hot dipped galvanized bolts with matching washers and nuts in accordance with ASTM A153.

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- I. Anchor rods shall be ASTM F1554 Grade 55
- J. Shear Studs shall meet the requirements of ASTM A29 provided in a condition defined in ASTM A108. The mechanical requirements shall match those stated in AWS D1.1 Table 7.1 for Type B. They shall be ¾" x 4" unless noted otherwise.
- K. Welding electrodes: Meeting AWS D1.1

2.2 SHOP PAINTING

- A. Preparation: Remove loose scale, rust and other foreign materials from fabricated joists and accessories before application of shop paint.
- B. Shop Paint shall be fabricators standard metal primer paint applied at a rate to produce a minimum dry film thickness of 2.0 mil.
- C. Paint all structural steel with a shop coat of paint except:
 - 1. Members encased in concrete
 - 2. Contact surfaces of welded connections and areas within 2" of field welds
 - 3. Contact surfaces of high-strength bolted connections
 - 4. Surfaces receiving sprayed on fireproofing
 - 5. Surfaces receiving field welded steel studs

2.3 FABRICATION

- A. Comply with AISC Specifications, unless noted or called for in these specifications
- B. All steel fabrication shall be done on the premises of a fabricator registered and approved to perform such work without special inspections as described in Section 1704.2 of the International Building Code (IBC). As an alternative, if a fabricator is not approved as noted, the Contractor shall employ at his expense a special inspector to provide all inspections required by the IBC with regard to steel fabrication
- C. Shop connections shall be welded unless otherwise noted.
- D. Beams and girders shall be located with natural camber up unless otherwise noted.
- E. Drill or punch holes at right angles to metal surface. Do not make or enlarge holes by burning. Remove burrs resulting from drilling operations.
- F. Provide holes or slots in members to permit connection of work of other trades only with the approval of the Engineer.
- G. Connections:
 - 1. Conform to specifications listed in this specification
 - 2. Connections for non-composite beams shall be adequate to provide for the reaction due to the maximum uniformly distributed load for that span, based on the allowable unit stresses, except as noted otherwise.

3. Connections shall conform to those shown on the drawings unless otherwise approved by the Engineer.
4. Unless otherwise noted, all shop connections may be either bolted or welded and all field connections shall be bolted. Connections shown on the structural Drawings are schematic and are only intended to show the relationship of members connected. Connection details shown on the drawings shall be incorporated into the fabricator's connection design.
5. Unless noted, connections shall be designed as "simple framing" connections with the ends of beams and girders connected for shear only.
6. Unless noted bolted connections are to be designed as bearing type connections with threads included in the shear plane. A minimum of two bolts per connection must be used.
7. All bolted connections shall have one hardened flat washer under the turned element.

H. Welding:

1. Prior to commencing welding, bolt or tack elements in intimate contact and adjust to dimensions shown with allowance for weld shrinkage.
2. Welding shall be performed by welders currently qualified under AWS standard qualification procedure.
3. Welding shall be inspected in compliance with AWS D1.1 and section 1704.3.1 of the IBC.
4. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. At exposed connections, finish welds and surfaces smooth with contour of welded surface matching those adjacent.

2.4 GALVANIZATION

- A. Fabrications designated to be galvanized shall be pre-fabricated and then hot-dip galvanized according to ASTM A123/A123M Standard Specification for Zinc (Hot-dip Galvanized) Coatings on Iron and Steel Products. The fabrication shall be disassembled to the greatest extent reasonable prior to galvanization.
- B. Galvanized bolts, nuts and washers shall be used at all connections of galvanized assemblies.
- C. Fasteners and any small parts that can fit into a perforated spinner basket shall be governed by ASTM153/A153M.
- D. Shop drawings shall show adequate venting and drain holes in fabrications to allow thorough galvanization. Shop drawings for all enclosed or partially enclosed vessels or tubes shall be reviewed and approved by the Galvanizer prior to submittal for review by the Engineer. Such approval must be evident on the submittal to the Engineer.
- E. Vent holes provided in assemblies shall be closed with drive caps or plugs after galvanizing.
- F. Welded items that are to be galvanized must be carefully cleaned and use appropriate weld composition. The following should be considered:
 1. An uncoated electrode should be used wherever possible to prevent flux deposits.
 2. If a coated electrode is used, all welding flux residues must be removed by wire brushing, flame cleaning, chipping, grinding, pneumatic needle gun, or abrasive blast cleaning.

Welding flux residues are chemically inert in the normal pickling solutions used by galvanizers; their existence will produce rough and incomplete zinc coverage. Flux residue removal is normally the fabricator's responsibility unless other arrangements have been made.

3. A welding process such as metal-inert gas (MIG), tungsten-inert gas (TIG) or C02 shielded arc is recommended when possible since they produce essentially no slag.
4. In the case of heavy weldments, a submerged arc method is recommended.
5. If none of these are available, select a coated rod specifically designed for "selfslagging"
6. Choose a welding rod providing a deposited weld composition as close as possible to the parent metal. This will help prevent differential acid attack between the weld area and the parent metal during acid cleaning.
7. Welding rods high in silicon may cause excessively thick and/or darkened coatings to form in the welded area.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. Workmanship shall be equal to the best practices of a modern structural shop and in strict accordance with specifications referenced.

3.2 ERECTION

- A. The steel structure is a non-self-supporting steel frame and dependent upon diaphragm action of the roof deck and attachment to the side walls for stability and for resistance to wind and seismic forces. It is the Contractor's responsibility to brace the structure until the work is complete. The Contractor shall hire and pay a Professional Structural Engineer who is registered in the state in which the project is located to design and inspect all temporary bracing and shoring.
- B. Furnish to concrete contractor all required anchor bolts and other incidental items of structural steel required to be built into concrete or masonry. Furnish templates and location plans for installing these items.
- C. Verify alignment and elevations of foundations and location of anchor bolts on which the structural steel is in any way dependent and notify the Engineer in writing of any defects which would affect the satisfactory completion of this work. The starting of structural steel erection shall imply acceptance of the underlying surfaces.
- D. Grout base and bearing plates solid with a minimum of 1" thick non-shrinking grout
- E. Field correction of fabrication by flame cutting will only be permitted by written consent of the Engineer.
- F. All work shall be carefully and accurately assembled to carry out the design as shown. Erect the steel in order of sequence and schedule as previously arranged with the Engineer.

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- G. Welders shall be certified by an independent testing and inspection service. Tests for uncertified welders shall be at the expense of the contractor.
- H. All steel shall be erected square, plumb, and true to lines and levels. Any measures required to correct out of plumb steel columns, etc., will at the Contractor's expense.

3.3 FIELD PAINTING

- A. After erection, clean exposed surfaces of field connections, unpainted areas adjacent to field connections, and damaged areas in shop primer to the same standards as required for the shop coat and paint with identical primer.
- B. Surfaces shall be clean and dry before painting. Apply no paint in freezing weather.

END OF SECTION 051000

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel framing and supports for overhead doors.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Elevator machine beams and hoist beams.
4. Steel shapes for supporting elevator door sills.
5. Metal ladders.
6. Elevator pit sump covers.
7. Metal bollards.
8. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Section 042200 "Concrete Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:

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1. Shop primers.
 2. Shrinkage-resisting grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
1. Steel framing and supports for overhead doors.
 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 3. Elevator machine beams and hoist beams.
 4. Steel shapes for supporting elevator door sills.
 5. Metal ladders.
 6. Elevator pit sump covers.
 7. Metal bollards.
 8. Loose bearing and leveling plates for applications where they are not specified in other Sections.
 9. Loose steel lintels.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research Reports: For post-installed anchors.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- D. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- E. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.

- F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.4 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
 - 1. Available Products: Provide one of the following or approved substitute:
 - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
 - b. ICI Devco Coatings; Catha-Coat 313.
 - c. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
 - d. PPG Architectural Finishes, Inc.; Epoxy Zinc Rich Primer 97-670.
 - e. Sherwin-Williams Company (The); Zinc Clad IV, B69A8/B69V8.
 - f. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
 - 1. Available Products: Provide one of the following or approved substitute:
 - a. Sealmastic, Type 1; W. R. Meadows
 - b. MasterSeal 610; BASF.
 - c. Karnak 100 AF; Karnac Chemical Corp.
- F. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
 - 1. Available Products: Provide one of the following or approved substitute:
 - a. Five Star Grout by Five Star Products, Inc.
 - b. Masterflow 928 Grout by Master Builders Technologies.
 - c. SonogROUT 10K by BASF.
 - d. 14K Hy Flow by BASF.

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- G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

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- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Furnish inserts for units installed after concrete is placed.
- C. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.
 - 1. Provide bearing plates welded to beams where indicated.
 - 2. Drill or punch girders and plates for field-bolted connections where indicated.
 - 3. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches o.c.
- D. Galvanize miscellaneous framing and supports where indicated.
- E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 METAL LADDERS

- A. General:
 - 1. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Steel Ladders: Fabricate ladders as detailed on the drawings and per the following minimum standards:
 - 1. Space siderails 18 inches apart unless otherwise indicated.
 - 2. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
 - 3. Rungs: 1-inch-diameter, steel bars, spaced 12 inches o.c..
 - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 - 5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
 - 6. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
 - 7. Prime interior ladders, including brackets and fasteners, with universal shop primer.

2.8 ELEVATOR PIT SUMP COVERS

- A. Fabricate from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 3/4 inch in least dimension.
- B. Support Frame: Provide 1-1/2 by 1-1/2 by 1/4 inch steel angle around perimeter of sump pit, fastened with 1/4 inch galvanized expansion anchors.
- C. Galvanize steel elevator pit cover, including support frame and fasteners.

2.9 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 80 steel pipe.
- B. Prime steel bollards with zinc-rich primer.

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Prime plates with zinc-rich primer.

2.11 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

2.12 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.13 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.14 STEEL AND IRON FINISHES

- A. Galvanizing: Provide coating for iron and steel fabrications applied by the hot-dipped process, Duragalv by Duncan Galvanizing. The galvanizing bath shall contain high grade zinc and other earthly materials. Immediately before galvanizing, the steel shall be immersed in a bath of zinc ammonium chloride. The use of the wet kettle process is prohibited. Comply with ASTM A123 for fabricated products and ASTM A 153 for hardware. Provide thickness of galvanizing specified in referenced standards.

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1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 1. Shop prime with universal shop primer unless zinc-rich primer is indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

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3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.

3.3 INSTALLATION OF METAL BOLLARDS

- A. Anchor bollards in place with gravel backfill. Place backfill and vibrate or tamp for consolidation. Support and brace bollards in position.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 1. Do not fill removable bollards with concrete.

3.4 INSTALLATION OF BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
- C. Protect grout from freezing for 7 days to allow for curing.

3.5 ELEVATOR SUMP PIT COVER

- A. Set perimeter support angles 1/4 inch below the edge of the sump pit to allow the sump cover plate to set flush with elevator pit floor.

3.6 REPAIRS

- A. Touchup Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

SECTION 055113 - METAL PAN STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preassembled steel stairs with concrete-filled treads.
2. Steel tube railings and guards attached to metal stairs.
3. Steel tube handrails attached to walls adjacent to metal stairs.

B. Related Sections:

1. Section 033000 "Cast-in-Place Concrete" for concrete fill for stair treads and platforms.

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for metal stairs, railings, and guards.

1. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, blocking for attachment of wall-mounted handrails, and items with integral anchors, that are to be embedded in concrete or masonry.
2. Deliver such items to Project site in time for installation.

C. Schedule installation of railings and guards so wall attachments are made only to completed walls.

1. Do not support railings and guards temporarily by any means that do not satisfy structural performance requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For metal pan stairs and the following:

1. Shop primer products.
2. Handrail wall brackets.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.

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3. Include plan at each level.
 4. Indicate locations of anchors, weld plates, and blocking for attachment of wall-mounted handrails.
- C. Delegated-Design Submittal: For stairs, railings and guards, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the State in which Project is located.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification.
1. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.
 2. Protect steel members and packaged materials from corrosion and deterioration.
 3. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.
 - a. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stairs, railings and guards,, including attachment to building construction.

- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform Load: 100 lbf/sq. ft..
 - 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.
 - 5. Limit deflection of treads, platforms, and framing members to $L/360$ or 1/4 inch, whichever is less.

- C. Structural Performance of Railings and Guards: Railings and guards, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 250 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.

 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.

 - 3. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

- D. Seismic Performance of Stairs: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Component Importance Factor: 1.5.

2.2 METALS

- A. Metal Surfaces: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

- C. Steel Tubing for Railings and Guards: ASTM A500/A500M (cold formed) or ASTM A513/A513M.

- D. Steel Pipe for Railings and Guards: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- E. Uncoated, Cold-Rolled Steel Sheet: ASTM A1008/A1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.
- F. Uncoated, Hot-Rolled Steel Sheet: ASTM A1011/A1011M, either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.

2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B633.
 - 1. Select fasteners for type, grade, and class required.
- B. Fasteners for Anchoring Railings and Guards to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings and guards to other types of construction indicated and capable of withstanding design loads.
- C. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
- E. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Electrodes: Comply with AWS requirements.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; recommended by manufacturer for **[interior]** **[exterior]** use; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.
 - 1. Available Products include the following or approved substitute:
 - a. Five Star Grout by Five Star Products, Inc.
 - b. Masterflow 928 Grout by Master Builders Technologies.
 - c. SonogROUT 10K by BASF.
 - d. 14K Hy Flow by BASF.

2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings and guards, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- B. Assemble stairs, railings, and guards in shop to greatest extent possible.
 - 1. Disassemble units only as necessary for shipping and handling limitations.
 - 2. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately.
 - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 - 2. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 - Completely sanded joint with some undercutting and pinholes okay.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
 - 1. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated.
 - 2. Locate joints where least conspicuous.
 - 3. Fabricate joints that will be exposed to weather in a manner to exclude water.
 - 4. Provide weep holes where water may accumulate internally.

2.6 FABRICATION OF STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Commercial Class, unless more stringent requirements are indicated.
- B. Stair Framing:

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Fabricate stringers steel channels.
 - a. Stringer Size: As required to comply with "Performance Requirements" Article.
 - b. Provide closures for exposed ends of channel and rectangular tube stringers.
 - c. Finish: Shop primed.
2. Construct platforms of steel channel headers and miscellaneous framing members as required to comply with "Performance Requirements" Article.
 - a. Provide closures for exposed ends of channel and rectangular tube framing.
 - b. Finish: Shop primed.
3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
4. Where stairs are enclosed by gypsum board assemblies, provide hanger rods or struts to support landings from floor construction above or below.
 - a. Locate hanger rods and struts where they do not encroach on required stair width and are within the fire-resistance-rated stair enclosure.
5. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.

C. Metal Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements, but not less than 0.067 inch.

1. Fabricate treads and landing subplatforms of exterior stairs so finished walking surfaces slope to drain.
2. Steel Sheet: Uncoated, hot-rolled steel sheet.
3. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
4. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
5. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.
 - a. Smooth Soffit Construction: Construct subplatforms with flat metal under surfaces to produce smooth soffits.

2.7 FABRICATION OF STAIR RAILINGS AND GUARDS

- A. Fabricate railings and guards to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of member, post spacings, wall bracket spacing, and anchorage, but not less than that needed to withstand indicated loads.
 1. Configuration: As indicated on the drawings.
- B. Welded Connections: Fabricate railings and guards with welded connections.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Fabricate connections that are exposed to weather in a manner that excludes water.
 - a. Provide weep holes where water may accumulate internally.
 2. Cope components at connections to provide close fit, or use fittings designed for this purpose.
 3. Weld all around at connections, including at fittings.
 4. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 5. Obtain fusion without undercut or overlap.
 6. Remove flux immediately.
 7. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 - Completely sanded joint, some undercutting and pinholes are okay Finish #3 - Partially dressed weld with spatter removed as shown in NAAMM AMP 521.
- C. Form changes in direction of railings and guards as follows:
1. As detailed.
- D. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Close exposed ends of railing and guard members with prefabricated end fittings.
- F. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
1. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- G. Connect posts to stair framing by direct welding unless otherwise indicated.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work.
1. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
 2. For galvanized railings and guards, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous-metal components.
 3. For nongalvanized railings and guards, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
 4. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.
 5. Handrail Bracket for Wall Mounting: RB14030 by Wagner or equal.
 - a. Provide similar bracket without flange for welding to guardrails.
- I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.8 FINISHES

- A. Finish metal stairs after assembly.
- B. Preparation for Shop Priming: Prepare uncoated, ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of floors, bearing surfaces and locations of bearing plates, and other embedments for compliance with requirements.
 1. For wall-mounted railings, verify locations of concealed reinforcement within gypsum board and plaster assemblies.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF METAL PAN STAIRS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction.
 1. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
 2. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
 3. Comply with requirements for welding in "Fabrication, General" Article.
- F. Place and finish concrete fill for treads and platforms to comply with Section 033000 "Cast-in-Place Concrete."

3.3 INSTALLATION OF RAILINGS AND GUARDS

- A. Adjust railing and guard systems before anchoring to ensure matching alignment at abutting joints with tight, hairline joints.
1. Space posts at spacing indicated or, if not indicated, as required by design loads.
 2. Plumb posts in each direction, within a tolerance of 1/16 inch in 3 feet.
 3. Align rails and guards so variations from level for horizontal members and variations from parallel with rake of stairs for sloping members do not exceed 1/4 inch in 12 feet.
 4. Secure posts, rail ends, and guard ends to building construction as follows:
 - a. Anchor posts to steel by welding to steel supporting members.
 - b. Anchor handrail and guard ends to concrete and masonry with steel round flanges welded to rail and guard ends and anchored with post-installed anchors and bolts.
- B. Install railing gates level, plumb, and secure for full opening without interference.
1. Attach hardware using tamper-resistant or concealed means.
 2. Adjust hardware for smooth operation.
- C. Attach handrails to wall with wall brackets.
1. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
 2. Secure wall brackets to building construction as follows:
 - a. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - b. For hollow masonry anchorage, use toggle bolts.
 - c. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
 - d. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.

3.4 REPAIR

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

END OF SECTION 055113

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Model code evaluation reports for wood-preservative treated wood, engineered wood products and metal framing anchors.
- B. Related Work Specified Elsewhere – Related work and materials are found in the following sections:
 - 1. Section 051000 – Structural Steel

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.
- B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

2.2 TREATED MATERIALS

- A. Preservative-Treated Materials: Lumber treated according to AWWA standard U1-08 and meeting all State, Federal and local regulations.
 - 1. All pressure treated framing lumber shall be #2 and better Southern Yellow Pine.
 - 2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - 3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - 4. All treated materials shall meet the AWWA Use Category System Standard U1-08 for the applicable application.
 - a. Interior Plates on concrete: UC2
 - b. Exterior Posts and general framing materials: UC4A
 - c. Critical Structural members in direct contact with ground: UC4B
 - d. All structural foundation support members below concrete slab: UC5A
- B. Use preservative treated material for items indicated on Drawings, and the following:
 - 1. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Concealed members in contact with masonry or concrete.
 - 3. Wood floor plates that are installed over concrete slabs-on-grade.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- C. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20.
 - 1. Use Exterior type for exterior locations and where indicated.
 - 2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
 - 3. Use Interior Type A, unless otherwise indicated.
 - 4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Provide fire-retardant treated materials for items indicated on Drawings.

2.3 LUMBER

- A. Dimension Lumber:
 - 1. Maximum Moisture Content: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness
 - 2. Non-Load-Bearing Interior Partitions: No.1/No.2 Spruce/Pine/Fir: NELMA rated.
 - 3. Framing Other Than Non-Load-Bearing Partitions: No.1/No.2 Spruce/Pine/Fir: NLGA
 - 4. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
 - a. Species: As specified for framing other than non-load bearing partitions.
 - b. Grade: **No. 1/No. 2**
- B. Exposed Boards: Mixed southern pine, No. 1: SPIB; or Hem-fir, Select Merchantable or No. 1 Common: NLGA, WCLIB, or WWPA with 15 percent maximum moisture content.
- C. Concealed Boards: Eastern softwoods, No. 3 Common: NELMA or Northern species, No. 3 Common: NLGA with 15 percent maximum moisture content.
- D. Miscellaneous Lumber: Construction, or No. 2 grade with 15 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

2.4 ENGINEERED WOOD PRODUCTS

- A. Engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be demonstrated by comprehensive testing.
- B. Laminated-Veneer Lumber: Manufactured with exterior-type adhesive complying with ASTM D 2559. Allowable design values determined according to ASTM D 5456.
 - 1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi for 12-inch nominal-depth members.
 - 2. Modulus of Elasticity, Edgewise: 1,900,000 psi.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- C. Plywood and other structural wood panels shall conform to and be stamped with the American Plywood Association APA Grade trademark and meet Product Standard PS-1 and/or the Performance Rating PRP-108 for the panels specified.
- D. Wood I-Joists: Prefabricated units, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.
 - 1. Web Material: Either oriented strand board or plywood, Exposure 1
 - 2. Structural Properties: Provide units with depths and design values not less than those indicated.
 - 3. Provide units complying with APA PRI-400, factory marked with nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.
 - 4. Design based on I-Level as manufactured by Weyerhaeuser.

2.5 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: Plywood, Exposure 1, C-D Plugged, fire-retardant treated, not less than $\frac{3}{4}$ inch thick.

2.6 MISCELLANEOUS PRODUCTS

- A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 1. Power-Driven Fasteners: CABO NER-272.
 - 2. Bolts: Unless otherwise noted, steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
 - 3. Hangers and miscellaneous hardware: Unless otherwise noted, structural ties and hangers are Simpson Strong-Tie. All fasteners and hangers in contact with preservative treated materials shall be heavy galvanized steel.
 - 4. All structural bolts in contact with preservative treated material shall be A307 hot dipped galvanized bolts with matching washers and nuts in accordance with ASTM A153.
- B. Metal Framing Anchors: Structural capacity, type, and size indicated.
 - 1. Use anchors made from hot-dip galvanized steel complying with ASTM A 653/A 653M, G60 coating designation for interior locations where stainless steel is not indicated.
 - 2. Use anchors made from stainless steel complying with ASTM A 666, Type 304 for exterior locations subject to salt water spray unless otherwise noted.
- C. Epoxy Anchoring Adhesive: two-component, high solids, epoxy-based adhesive designed for use as a non-shrink anchor grouting material. Shall meet or exceed ASTM C-881 for Type I, II, IV and V, Grade 3, Class B & C. Basis of Design: SET High Strength Epoxy-Tie Anchoring Adhesive.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- D. See Section 051000 – Structural Steel for related anchors, rods, fasteners and connection plate material requirements with regard to galvanization and material classifications.
- E. Sill-Sealer: Closed-cell neoprene foam, 1/4 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All framing shall be meet or exceed the requirements of IBC 2015 section 2308
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Connection of timber framing members to ledge or rock shall be done with galvanized threaded rod and epoxy adhesive. Follow manufacturers recommendations for installation of epoxy adhesive systems.
- D. Securely attach rough carpentry to substrates and other members, complying with the following:
 - 1. CABO NER-272 for power-driven fasteners.
 - 2. Published requirements of metal framing anchor manufacturer.
 - 3. Table 2304.10.1, “Fastener Schedule”: International Building Code (2015)

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Composite insulating wall sheathing.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS

- A. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- B. Factory mark panels to indicate compliance with applicable standard.

2.2 WALL SHEATHING

- A. Refer to the Structural drawings.

2.3 ROOF SHEATHING

- A. Refer to the Structural drawings.

2.4 COMPOSITE INSULATING WALL SHEATHING

- A. Composite Insulating Wall Sheathing: Oriented-strand-board Exposure 1 sheathing 7/16 inch thick, with factory-laminated water-resistive barrier exterior facer, and with rigid foam plastic insulating board laminated to interior face.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods LLC; ZIP System R-Sheathing.
 2. Span Rating and Performance Category of Sheathing Layer: Not less than 24/16; 7/16 Performance Category.
 3. Thermal Resistivity (R Value): 9.6 deg F x h x sq. ft./Btu x in. at 75 deg F.
 4. Thickness: 2 inch.
 5. Edge Profile: Square edge.
 6. Exterior Facer: Medium-density, phenolic-impregnated polymer-modified sheet material meeting requirements for ASTM D779 Grade D weather-resistive barrier in accordance with ICC AC38 and AC310, with fastener spacing symbols on exterior facer for 16-inch (406 mm) and 24-inch (610 mm) on center spacing, with the following characteristics:
 - a. Water Resistance of Coatings, ASTM D2247: Pass 14 day exposure test.
 - b. Moisture Vapor Transmission, ASTM E96: Not less than 12 perms.
 - c. Water Penetration, ASTM E331: Pass at 2.86 lbf/sq. ft..
 - d. Wind Driven Rain, TAS-100: Pass.
 - e. Accelerated Weathering, ASTM G154: Pass.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Screws for Fastening Composite Insulating Wall Sheathing: Steel drill screws, in type and length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.

2.6 MISCELLANEOUS MATERIALS

- A. Self-Adhering Tape: Pressure-sensitive, self-adhering, cold-applied, proprietary seam tape consisting of polyolefin film with acrylic adhesive.
1. Basis-of-Design Product: Subject to compliance with requirements provide Huber Engineered Woods; ZIP System Tape.
 2. Thickness: 0.012 inch.
 3. Code Compliance: Comply with requirements of authorities having jurisdiction and ICC Evaluation Service, Inc. "AC148 (2006) - Acceptance Criteria for Flexible Flashing Material."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Combination Subfloor-Underlayment:
 - a. Glue and nail to wood framing.
 - b. Space panels 1/8 inch apart at edges and ends.
 - 2. Subflooring:
 - a. Glue and nail to wood framing.
 - b. Space panels 1/8 inch apart at edges and ends.
 - 3. Wall and Roof Sheathing:
 - a. Nail to wood framing.
 - b. Space panels 1/8 inch apart at edges and ends.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

4. Composite Insulating Wall Sheathing: Attach sheathing panels securely to substrate with manufacturer-approved fasteners in compliance with the following:
 - a. IBC: Table 2304.9.1 Fastening Schedule.

3.3 SHEATHING JOINT TREATMENT

- A. Seal sheathing joints according to Zip sheathing manufacturer's written instructions.
 1. Apply proprietary seam tape to joints between sheathing panels.
 2. Utilize self-adhering tape gun or hard rubber roller provided by manufacturer to ensure tape is completely adhered to substrates.

END OF SECTION 061600

SECTION 061753 – SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads indicated without exceeding TPI 1 deflection limits.
- B. Submittals: Product Data, Shop Drawings, and structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- D. Comply with applicable requirements and recommendations of the following publications:
 - 1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
 - 2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
 - 3. TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
- E. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review, any species, graded visually or mechanically.
 - 1. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
- B. Connector Plates: TPI 1, fabricated from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.
- C. Fasteners: Where trusses are exposed to weather or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- D. Metal Framing Anchors: Provide framing anchors made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- E. Provide Truss hangers as required to develop the full capacity of the truss if ends are not bearing directly on structural beams.

2.2 FABRICATION

- A. Assemble trusses using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted. Fabricate wood trusses within manufacturing tolerances in TPI 1.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and brace trusses according to TPI recommendations and as indicated. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- B. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor.
- C. Securely connect each truss ply required for forming built-up girder trusses. Anchor trusses to girder trusses.
- D. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Division 6 Section "Rough Carpentry"
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- E. Install wood trusses within installation tolerances in TPI 1.
- F. Do not cut or remove truss members.
- G. Remove wood trusses that are damaged or do not meet requirements and replace with trusses that do meet requirements.
- H. Provide permanent truss bracing as noted on the drawings.

END OF SECTION 061753

SECTION 062013 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior wood trim with metal cladding.
2. Synthetic trim.
3. Synthetic siding.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

B. Samples for Verification:

1. For wood siding and trim, 50 sq. in. for board types and 8 by 10 inches for panels.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

1.4 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 EXTERIOR WOOD TRIM

A. Lumber Trim for Metal-Cladding:

1. Species and Grade: Eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NeLMA, Finish or No. 2.
2. Maximum Moisture Content: 15 percent.
3. Finger Jointing: Allowed if made with wet-use adhesive complying with ASTM D5572.
4. Face Surface: Surfaced (smooth).

2.2 SYNTHETIC TRIM

A. Synthetic Trim: Extruded composite consisting of bio-based polyer with coal-combustion ash.

1. Product: Subject to compliance with requirements, product that may be incorporated into the Work include the following:
 - a. Boral Composites, Inc.; TruExterior® Trim.
2. Density: ASTM C 1185: 40 to 50 pcf.
3. Heat Deflection Temperature: Not less than 130 deg F, per ASTM D 648.
4. Coefficient of Thermal Expansion: ASTM D 6341, Typical: 1.40E-05 in/in/degree F, tested at minus 30 to 140 degrees F.
5. Water Absorption: ASTM D 570: Less than 1.5 percent.
6. Flame Spread: ASTM E 84: Between 25 and 29.
7. Smoke Developed, ASTM E 84: Less than 450.
8. Finish: Factory primed.

2.3 SYNTHETIC SIDING

A. Synthetic Trim: Extruded composite consisting of bio-based polyer with coal-combustion ash.

1. Product: Subject to compliance with requirements, product that may be incorporated into the Work include the following:
 - a. Boral Composites, Inc.; TruExterior® V-Rustic Siding.
2. Density: ASTM C 1185: 40 to 50 pcf.
3. Heat Deflection Temperature: Not less than 130 deg F, per ASTM D 648.
4. Coefficient of Thermal Expansion: ASTM D 6341, Typical: 1.40E-05 in/in/degree F, tested at minus 30 to 140 degrees F.
5. Water Absorption: ASTM D 570: Less than 1.5 percent.
6. Flame Spread: ASTM E 84: Between 25 and 29.

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7. Smoke Developed, ASTM E 84: Less than 450.
8. Size: 1 by 6 inch nominal.
9. Finish: Factory primed.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide stainless steel nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.
- B. Metal Cladding and Trim Flashing: Provide pre-finished, 0.019 inch thick aluminum cladding.
- C. Drainage Material: Product shall maintain a continuous open space between water-resistive barrier and exterior cladding to create a drainage plane and shall be used under siding.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advanced Building Products; Mortairvent® 202.
 - b. Benjamin Obdyke; Home Slicker.
 - c. CavClear/Archovations, Inc.; Rainscreen Mat. (.25")
 - d. Keene Building Products; Driwall™ Rainscreen 020-1.
 - e. Stuc-O-Flex International, Inc.; WaterWay Rainscreen, 7mm.

2.5 FABRICATION

- A. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut exterior finish carpentry to fit adjoining work.
 - 3. Refinish and seal cuts as recommended by manufacturer.
 - 4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 - 5. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
 - 6. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 INSTALLATION OF STANDING AND RUNNING TRIM

- A. Install flat-grain lumber with bark side exposed to weather.
- B. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary.
 - 1. Use scarf joints for end-to-end joints.
 - 2. Stagger end joints in adjacent and related members.
- C. Fit exterior joints to exclude water.
 - 1. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint.
 - 2. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.5 INSTALLATION OF SIDING

- A. Wood Siding:
 - 1. Install boards with edges over framing or blocking.
 - 2. Leave 3/16-inch gap at perimeter, openings, and horizontal panel joints unless otherwise recommended by panel manufacturer.
 - 3. Seal butt joints at inside and outside corners and at trim locations.
- B. Flashing: Install metal flashing as indicated on Drawings and as recommended by siding manufacturer.

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- C. Finish: Apply finish within two weeks of installation.

3.6 DRAINAGE MATERIAL INSTALLATION

- A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

3.7 ADJUSTING

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

3.8 CLEANING

- A. Clean exterior finish carpentry on exposed and semiexposed surfaces.

3.9 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062013

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior trim.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

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2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.

2.2 INTERIOR TRIM

- A. Softwood Lumber Trim for Transparent Finish (Stain and Clear Finish):
 1. Species and Grade: Eastern white pine, Select or No. 1; NeLMA or NLGA.
 2. Maximum Moisture Content: 15 percent.
 3. Finger Jointing: Not allowed.
 4. Face Surface: Surfaced (smooth).
- B. Lumber Trim for Opaque Finish (Painted Finish):
 1. Species and Grade: Poplar; B finish; NHLA.
 2. Maximum Moisture Content: 15 percent.
 3. Finger Jointing: Allowed.
 4. Face Surface: Surfaced (smooth).

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

2.4 FABRICATION

- A. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 - 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
 - 1. Do not use pieces less than 24 inches long, except where necessary.
 - 2. Stagger joints in adjacent and related standing and running trim.
 - 3. Cope or miter, to match exiting, at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.

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4. Use scarf joints for end-to-end joints.
5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
7. Install trim after gypsum-board joint finishing operations are completed.
8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
9. Fasten to prevent movement or warping.
10. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

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

3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

SECTION 066400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic sheet paneling.

B. Related Requirements:

1. Section 102600 "Wall and Door Protection" for corner guards installed over plastic paneling.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

1. Training: Installer who has attended Manufactures' installation training clinic.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.2 PLASTIC SHEET PANELING (FRP1)

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319.
1. Manufacturer: Subject to compliance with requirements, provide product by the following:
 - a. Crane Composites, Inc.; Fire-X Glasbord.
 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 3. Nominal Thickness: Not less than 0.090 inch.
 4. Surface Finish: Pebble.
 5. Color: White.

2.3 PLASTIC SHEET PANELING (FRP2)

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319.
1. Manufacturer: Subject to compliance with requirements, provide product by the following:
 - a. Marlite; Symmetrix FRP Panels.
 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E84. Identify products with appropriate markings of applicable testing agency.
 - a. Class III/C fire rating.
 3. Nominal Thickness: Not less than 3/32 inch.
 4. Surface Finish: Pattern G63; Smooth surface with filled grooves at 3 and 6 inches o.c. to resemble subway tile.
 5. Color: White.

2.4 ACCESSORIES

- A. Trim Accessories for FRP1: Manufacturer's standard one-piece, stainless steel extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, cove base and caps as needed to conceal edges.
1. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.

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- a. Finish: #4 stainless steel.
- B. Trim Accessories for FRP2: Manufacturer's standard one-piece or two-piece, snap-on vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
 - 1. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.
 - a. Color: Match panels.
- C. Adhesive: As recommended by plastic paneling manufacturer.
- D. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Remove wallpaper, vinyl wall covering, loose or soluble paint, and other materials that might interfere with adhesive bond.
- B. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- C. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- D. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- E. Lay out paneling before installing. Locate panel joints so that trimmed panels at corners are not less than 12 inches wide.
 - 1. Mark plumb lines on substrate at trim accessory or panel joint locations for accurate installation.
 - 2. Locate trim accessories and panel joints to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install factory-laminated panels using concealed mounting splines in panel joints.
- D. Install trim accessories with nails or staples. Do not fasten through panels.
- E. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- F. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- G. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant.
- H. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied, emulsified-asphalt dampproofing.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for bituminous vapor retarders under slabs-on-grade.
2. Section 071613 "Polymer-Modified Cement Waterproofing" for elevator pit waterproofing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.
- B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide [**protection course**] [**drainage panels**] [**and**] auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

- A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise indicated.

2.3 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. BASF.
 - 2. Henry.
 - 3. Karnak Corporation.
 - 4. W.R. Meadows, Inc.

- B. Trowel Coats: ASTM D 1227, Type II, Class 1 or Type IV.
 - 1. Available Products:
 - a. Sealmastic, Type 3; W. R. Meadows
 - b. 785 Asphalt Emulsion Sealer and Dampproofer; Henry.
 - c. MasterSeal 614; BASF.
 - d. Karnak 920 AF; Karnac Chemical Corp.

- C. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1 or Type IV.
 - 1. Available Products:
 - a. Sealmastic, Type 2; W. R. Meadows
 - b. 789 Fibered Asphalt Emulsion Sealer and Dampproofer; Henry.
 - c. MasterSeal 615; BASF.
 - d. Karnak 220 AF; Karnac Chemical Corp.

- D. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.
 - 1. Available Products:
 - a. Sealmastic, Type 1; W. R. Meadows
 - b. 107 Asphalt Emulsion Sealer and Dampproofer; Henry.
 - c. MasterSeal 610; BASF.
 - d. Karnak 100 AF; Karnac Chemical Corp.

2.4 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

- B. Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

- C. Asphalt-Coated Glass Fabric: ASTM D1668/D1668M, Type I.

- D. Patching Compound: Asbestos-free fibered mastic of type recommended in writing by dampproofing manufacturer.

2.5 PROTECTION

- A. Insulation, General: Comply with Section 072100 "Thermal Insulation."
- B. Protection Course: Provide one of the following options:
 - 1. ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.
 - a. Thickness: Nominal 1/8 inch or 1/4 inch.
 - b. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer for protection course type.
 - 2. Fan folded, with a core of extruded-polystyrene board insulation faced on one side with plastic film, nominal thickness 1/4 inch, with a compressive strength of not less than 8 psi per ASTM D1621, and maximum water absorption by volume of 0.6 percent per ASTM C272/C272M.
 - 3. Extruded-polystyrene board insulation, unfaced, ASTM C578, Type X, 1/2 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the Work.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.
- B. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- C. Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.
- D. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
 - 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. On Concrete Foundations: Apply 2 brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat, 1 fibered brush or spray coat at not less than 3 gal./100 sq. ft., or 1 trowel coat at not less than 4 gal./100 sq. ft..

3.5 PROTECTION

- A. Correct dampproofing that does not comply with requirements; repair substrates, and reapply dampproofing.
- B. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

END OF SECTION 071113

SECTION 071613 – POLYMER-MODIFIED CEMENT WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes polymer-modified cement waterproofing for elevator pits.
- B. Related Sections:
 - 1. Division 03 Section “Cast-In-Place Concrete.”

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, installation, technical data, and tested physical and performance properties of waterproofing.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who has installed manufacturer's products or an experienced Waterproofing Applicator.
- B. Source Limitations: Obtain waterproofing materials through one source from a single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.
- C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.

- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

PART 2 - PRODUCTS

2.1 POLYMER-MODIFIED CEMENT WATERPROOFING

- A. Trowel-applied, polymer-modified cementitious waterproofing to create positive and negative protection to water intrusion.
 - 1. Products: Provide one of the following:
 - a. Five Star® Waterproofing by Five Star Products, Inc.
 - b. Aquafin-1K by Aquafin.
 - 2. Provide patching materials as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 - 1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
 - 2. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

3.3 WATERPROOFING APPLICATION

- A. Install waterproofing according to waterproofing manufacturer's written instructions and the following:
 - 1. Apply waterproofing to the floor and walls of the elevator pit to a minimum thickness of 1/8 inch after elevator jack hole has been poured around with cast-in-place concrete.
 - 2. Trowel all surfaces to a smooth, hard finish, free from pits, hollows and other defects.
 - 3. Provide 1 by 1 inch cant at intersection of horizontal and vertical surfaces.

3.4 PROTECTION AND CLEANING

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071613

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Sprayed Foam insulation.
4. Vapor retarders.

B. Related Requirements:

1. Section 061600 "Sheathing" for insulated sheathing installed directly over wood framing.
2. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Sprayed Foam insulation.
4. Vapor retarders.

1.3 INFORMATIONAL SUBMITTALS

- A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Research Reports: For foam-plastic insulation, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:

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1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

- A. Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved substitute:
 - a. DuPont; Styrofoam Square Edge Insulation.
 - b. KingSpan; GreenGuard Type IV 25 PSI Insulation Board. (meets NFPA 285)
 - c. Owens Corning; Foamular® 250.
 2. R-Value: 5.0 per inch of insulation.
 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
 4. Application: Foundation and below slab insulation.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved substitute:
 - a. CertainTeed Corporation.
 - b. Guardian Building Products, Inc.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Owens Corning.
 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 4. R-Value: 3.0 to 3.2 per inch of insulation, depending on thickness.
 5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
 6. Application: Exterior walls.

2.3 SPRAYED FOAM INSULATION

- A. Sprayed Polyurethane Foam Sealant for Perimeter of Doors and Windows: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft. density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
1. Products:
 - a. Great Stuff Window & Door by Dow.
 - b. Froth-Pak Foam Sealant by Dow.
 - c. Zerodraft Insulating Air Sealant by Zerodraft.
- B. Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, minimum density of 1.5 lb/cu. ft..
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Corbond® Performance Insulation System.
 - b. Gaco Wallfoam 183M Closed Cell Spray Polyurethane Foam by Gaco Western.
 - c. Henry Permax 1.8 Closed Cell Foam Insulation.
 - d. Styrofoam™ SPF Insulation.
 - e. Accella Polyurethane Systems, Bayseal CCX.
 2. Flame/Smoke Properties: 25/450 in accordance with ASTM E84.
 3. R-Value, Aged: 6.2 per inch of insulation.

2.4 VAPOR RETARDERS

- A. Vapor Retarders: Polyimide film vapor retarder for use with unfaced, vapor permeable glass fiber and mineral wool insulation in wall and ceiling cavities. Material has a permeance of 1 perm or less when tested to ASTM E 86, dry cup method and increases to greater than 10 perms using the wet cup method.
1. Product: Certainteed MemBrain.
 2. Water Vapor Permeance:
 - a. ASTM E 86, dry cup method: 1.0 perms (57ng/Pa*s*m2).
 - b. ASTM E 86, wet cup method: 10.0 perms (1144ng/Pa*s*m2).
 3. Fire Hazard Classification: ASTM E 84:
 - a. Maximum Flame Spread Index; 20.
 - b. Maximum Smoke Developed Index; 55.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed, unless Installer's Certification is provided.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

- A. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 - 1. If not otherwise indicated, extend insulation a minimum of 48 inches in from exterior walls.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. On vertical foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 - 1. If not otherwise indicated, extend insulation a minimum of 48 inches below exterior grade line.
- B. Butt panels together for tight fit.
- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.
- C. Sprayed Foam Insulation: Comply with insulation manufacturer's written instructions applicable to products and applications. Spray insulation to envelop entire area to be insulated and fill voids. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam. Install into cavities formed by framing members to achieve thickness indicated on Drawings.

3.6 INSTALLATION OF VAPOR RETARDERS ON FRAMING

- A. Place vapor retarders on side of construction indicated on Drawings.
- B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.7 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes.

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- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building wrap.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

1.3 WARRANTY

- A. 10 years.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

- A. Building Wrap: Air barrier; with flame-spread and smoke-developed indexes of less than 15 and 75, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Benjamin Obdyke; HydroGap Drainable Housewrap.

2. Water-Vapor Permeance: Not less than 16 perms per ASTM E 96/E 96M, Desiccant Method (Procedure A).

3. Air Permeance: Not more than 0.002 cfm/sq. ft. (0.010 L/s x sq. m at 75 Pa) at 0.3-inch wg when tested according to ASTM E 2178.

4. Allowable UV Exposure Time: Not less than three months.

- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.2 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin and compatible with weather barrier.
- B. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.
- C. Nails and Staples: As recommended by the manufacturer for application.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Building Wrap: Comply with manufacturer's written instructions.
 - 1. Install air barrier sheet complete and continuous to substrate in a sequential overlapping weatherboard method starting at bottom or base of wall and working up.
 - 2. Complete detail Work around corners, wall openings, building transitions and penetrations prior to field applications.
 - 3. Stagger all end lap seams.
- B. Inside and Outside Corners:
 - 1. Pre-treat inside and outside corners with air barrier transition and flashing membrane extending a minimum of 5 inches from inside and outside corners, or overlap field material a minimum of 3 inches in each direction.
 - 2. Align and position air barrier transition and flashing membrane, remove protective film and press firmly into place. Provide minimum 3 inch overlap at all side laps and minimum 3 inch overlap at all end laps of membrane.
 - 3. Roll membrane and lap seams with roller to ensure positive contact and adhesion.
- C. Window, Door and Other Wall Openings:
 - 1. To avoid waste, predetermine best method and sequence to the install air barrier transition and flashing membrane around window or wall openings subject to the opening size and installation of window, door or louver type.
 - 2. Wrap air barrier transition and flashing membrane into wall openings to cover sill, jambs and head. It is not required to install continuous sheets through corners.
 - 3. Install corner flashing membrane into corners over flashing membrane. Secure corners into position with flashing tape and seal to air barrier.
 - 4. Subject to window installation requirements, install sill pan system and seal to installed air barrier window flashing membrane with sealant.
 - 5. Install windows in accordance with window manufacturer's details and cover nail flange with flashing tape. Install flashing tape along jamb and across head flanges of window and seal to installed self-adhered air barrier transition membrane. Roll tape to ensure positive contact to substrate. Seal exposed leading edge of tape.

3.2 PROTECTION

- A. Protect wall areas covered with air barrier from damage due to construction activities, high wind conditions, and extended exposure to inclement weather.
- B. Review condition of air barrier prior to installation of cladding. Repair, or remove and replace damaged sections with new membrane.
- C. Recommend to cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed self-adhered water-resistive vapor permeable air barrier installations.
- D. Remove and replace weather barrier membrane affected by chemical spills or surfactants.

END OF SECTION 072500

SECTION 072616 - BELOW-GRADE VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Vapor retarders under slabs-on-grade.

1.2 DEFINITIONS

- A. Vapor Retarder: Material with a water vapor transmission rating of not over 0.04g per square foot per hour.
- B. Vapor Barrier: Material with a water vapor transmission rating of not over 0.015g per square foot per hour.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: 12 inch square units for each type of vapor retarder, vapor barrier, or air barrier indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.5 PROJECT CONDITIONS

- A. Separate and recycle waste materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers and Products: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following products listed in Part 2 of this Section.

2.2 VAPOR RETARDERS FOR UNDER SLABS

- A. Vapor Retarder with extremely low permeance for critically sensitive, low permeance floor coverings such as rubber, vinyl, urethane, epoxy and methyl methacrylate, as well as linoleum and wood, having the following qualities:
 - 1. Minimum Permeance: ASTM E-96, not greater than 0.01 perms.
 - 2. Tensile Strength: ASTM E154 or D638, Class A – over 45 lbf/in.
 - 3. Puncture Resistance: ASTM E-154, Class B – over 1700 grams.
 - 4. Water Vapor Barrier: ASTM E-1745, meets or exceeds Class B.
 - 5. Thickness of Barrier (Plastic) ACI 302.1R-96, not less than 15 mils.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Stego Wrap, 15 mil thick vapor retarder by Stego Industries LLC, (877) 464-7834.
 - 2. Griffolyn® 15 by Reef Industries.
 - 3. Sealtight Perminator 15 mil Underslab Vapor-Mat by W.R. Meadows, Inc.
 - 4. Viper VaporCheck II 15 mil by Insulation Solutions, Inc.
- C. Vapor-Retarder Tape (for slabs): Stego Warp red polyethylene tape or tape as recommended by the manufacturer.
- D. Double-Stick Edge Tape: Preformed 1-1/2" wide two-sided adhesive. Available products include "Fab Tape" by Reef Industries.
- E. Expansion Joint Filler: Installer may elect to use Deck-O-Foam Expansion Joint Filler by WR Meadows or equal. Foam expansion joint filler with pre-scored removable strip for installation of joint sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

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- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to vapor retarders, including removing projections capable of puncturing vapor retarders, or of interfering with attachment.
- B. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions applicable to products and application indicated.
- B. Extend retarders in thickness indicated to envelop entire area to be covered. Cut and fit tightly around obstructions.

3.4 INSTALLATION OF UNDER-SLAB VAPOR RETARDERS

- A. Moisture vapor retarder system shall be installed at all interior floor slabs and as otherwise indicated in the drawings in strict accordance with the manufacturer's printed instructions and as follows:
 1. Snap chalk line along inside perimeter of foundation walls at top of slab elevation.
 2. Without wetting, clean a 3" wide band on the surface of the concrete below the chalk line at approximately mid-slab height. Remove dirt, residual form release, or other bond inhibiting surface contaminants. Grind smooth any surface projections within the band.
 3. While removing the contact paper on the backside, firmly press 2" wide double-stick edge tape onto wall, parallel to the chalk line on the cleaned band at mid-slab elevation.
 4. Remove contact paper on the face side.
 5. Apply a 12" wide strip of vapor retarder covering only the bottom 1" of contact surface on the edge tape. Cut, fit, and seal corner details with vapor retarder seaming tape.
 6. Align top edge of Deck-O-Foam expansion joint material to chalk line, and press material onto remaining 1" of exposed perimeter strip adhesive.
 7. Roll out vapor retarder material, overlapping edge rolls and all seams by 3". Tape all seams with vapor retarder seaming tape.
 8. Seal all penetrations (including pipes) per manufacturer's instructions.
 9. All tears, punctures, etc. to be repaired and taped as required to maintain the watertight integrity of the vapor retarder system.

3.5 PROTECTION

- A. Protect installed vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where vapor retarders are subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072616

SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass-fiber-reinforced asphalt shingles.
2. Underlayment materials.
3. Metal flashing and trim.

1.2 DEFINITIONS

- A. Roofing Terminology: See ASTM D1079 for definitions of terms related to roofing Work in this Section.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Asphalt shingles.
2. Underlayment materials.
3. Asphalt roofing cement.
4. Elastomeric flashing sealant.

B. Shop Drawings: For metal flashing and trim.

C. Samples for Initial Selection:

1. For each type of asphalt shingle indicated.
2. For each type of accessory involving color selection.

D. Samples for Verification: For the following products, in sizes indicated:

1. Asphalt Shingles: Full size.
2. Ridge and Hip Cap Shingles: Full size.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each type of asphalt shingle and underlayment product indicated, for tests performed by a qualified testing agency.

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- C. Research Reports: For synthetic underlayment, from ICC-ES, indicating that product is suitable for intended use under applicable building codes.
- D. Sample Warranty: For manufacturer's materials warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For asphalt shingles to include in maintenance manuals.
- B. Materials warranties.
- C. Roofing Installer's warranty.

1.6 MAINTENANCE MATERIAL SUBMITTALS

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

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.
- B. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.
- C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing Work is not in progress.
- D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.
 - 1. Install self-adhering, polymer-modified bitumen sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.9 WARRANTY

- A. Materials Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

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1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
2. Materials Warranty Period: 40 years from date of Substantial Completion, prorated, with first 10 years nonprorated.
3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 110 mph for five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of product from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance in accordance with ASTM E108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
- B. Wind Resistance: Provide asphalt shingles that comply with requirements of ASTM D3161/D3161M, Class F, and with ASTM D7158/D7158M, Class H.
- C. Energy Performance, ENERGY STAR: Provide asphalt shingles that are listed on the DOE's "ENERGY STAR Roof Product List" for steep-slope roof products.

2.3 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles (40 year): ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved substitute:
 - a. CertainTeed Corporation: Landmark Premium.
 - b. Elk Premium Building Products, Inc.; Prestique I High Definition.
 2. Butt Edge: Straight cut.
 3. Strip Size: Manufacturer's standard.
 4. Algae Resistance: Granules treated to resist algae discoloration.
 5. Color and Blends: As selected by Architect from manufacturer's full range.
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.4 UNDERLAYMENT MATERIALS

- A. Synthetic Underlayment: UV-resistant polypropylene, polyolefin, or polyethylene polymer fabric with surface coatings or treatments to improve traction underfoot and abrasion resistance; evaluated and documented to be suitable for use as a roof underlayment under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved substitute:
 - a. Alpha ProTech: Rex SynFelt.
 - b. Certainteed: Roof Runner.
 - c. GAF Materials Corporation; TigerPaw Roof Deck Protection.
 - d. Grace Construction Products; W.R. Grace & Co. -- Conn.; Tri-Flex Extreme.
 - e. InterWrap; RhinoRoof U20.
 - f. Owens Corning; Deck Defense™ High Performance Roof Underlayment.
 - g. RKWUS, Inc.; Roof Top Guard II.
- B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil-thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following or approved substitute:
 - a. Ice & Water Shield, W. R. Grace & Co. - Conn.

2.5 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D4586/D4586M Type II, asbestos free.
- B. Elastomeric Flashing Sealant: ASTM C920, Type S, Grade NS, one-part, non-sag, elastomeric polymer sealant; of class and use classifications required to seal joints and remain watertight; recommended in writing by manufacturer for installation of flashing systems.
- C. Roofing Nails: ASTM F1667, aluminum, stainless steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch-diameter, sharp-pointed, with a 3/8- to 7/16-inch-diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through sheathing less than 3/4 inch thick.
 - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- D. Synthetic-Underlayment Fasteners: As recommended in writing by synthetic-underlayment manufacturer for application indicated.
- E. Staples: Not allowed.

2.6 METAL FLASHING AND TRIM

- A. Sheet Metal: Aluminum, pre-finished white.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item unless otherwise specified in this Section or indicated on Drawings.
 - 1. Apron Flashings: Fabricate with lower flange a minimum of 5 inches over and 4 inches beyond each side of downslope asphalt shingles and 6 inches up the vertical surface.
 - 2. Step Flashings: Fabricate with a headlap of 2 inches and a minimum extension of 5 inches over the underlying asphalt shingle and up the vertical surface.
 - 3. Drip Edges: Fabricate in lengths not exceeding 10 feet with minimum 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.
- C. Vent Pipe Flashing: Pipes penetrating shingled roofs shall be ARFCO self-sealing neoprene collar with copper flange.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provisions have been made for flashings and penetrations through asphalt shingles.
 - 3. Verify that vent stacks and other penetrations through roofing are installed and securely fastened.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT MATERIALS

- A. Comply with asphalt shingle and underlayment manufacturers' written installation instructions and with recommendations in NRCA's "The NRCA Roofing Manual: Steep-Slope Roof Systems" applicable to products and applications indicated unless more stringent requirements are specified in this Section or indicated on Drawings.
- B. Synthetic Underlayment:
 - 1. Install on roof deck parallel with and starting at the eaves.

- a. Lap sides and ends as recommended in writing by manufacturer, but not less than 4 inches for side laps and 6 inches for end laps.
 - b. Stagger end laps between succeeding courses at interval recommended in writing by manufacturer, but not less than 72 inches.
 - c. Fasten with underlayment nails in accordance with manufacturer's written instructions.
 - d. Cover underlayment within period recommended in writing by manufacturer.
2. Install in single layer on roofs sloped at 4:12 and greater.
 3. Install in double layer on roofs sloped at less than 4:12.
 4. Install synthetic underlayment on roof deck not covered by self-adhering, polymer-modified bitumen sheet unless otherwise specified in this Section or indicated on Drawings.
 - a. Lap sides of underlayment over self-adhering sheet not less than 4 inches in direction to shed water.
 - b. Lap ends of underlayment not less than 6 inches over self-adhering sheet.
 5. Install fasteners in a grid pattern of 12 inches between side laps with 6-inch spacing at side and end laps.
 6. Terminate synthetic underlayment extended up not less than 4 inches against sidewalls, curbs, chimneys, and other roof projections.

C. Self-Adhering, Polymer-Modified Bitumen Sheet: Install, wrinkle free, on roof deck.

1. Comply with low-temperature installation restrictions of underlayment manufacturer.
2. Install lapped in direction that sheds water.
 - a. Lap sides not less than 4 inches.
 - b. Lap ends not less than 6 inches, staggered 24 inches between succeeding courses.
 - c. Roll laps with roller.
3. Prime concrete, masonry, and metal surfaces to receive self-adhering sheet.
4. Eaves: Extend from edges of eaves two course up the roof.
5. Valleys: Extend from lowest to highest point 32 inches on each side of centerline.
6. Sidewalls: Extend 18 inches beyond sidewalls and return vertically against sidewalls not less than 18 inches.
7. Cover underlayment within seven days.

3.3 INSTALLATION OF METAL FLASHING AND TRIM

- A. Install metal flashings in accordance with recommendations in ARMA's "Asphalt Roofing Residential Manual - Design and Application Methods" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.
- C. Step Flashings: Install with a headlap of 2 inches and extend over underlying shingle and up the vertical face.

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1. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying shingle.
 2. Fasten to roof deck only.
- D. Rake Drip Edges: Install over underlayment materials and fasten to roof deck.
- E. Eave Drip Edges: Install below underlayment materials and fasten to roof deck.
- F. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 INSTALLATION OF ASPHALT SHINGLES

- A. Install asphalt shingles in accordance with manufacturer's written instructions.
- B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip with tabs removed at least 7 inches wide with self-sealing strip face up at roof edge.
- C. Install first and remaining courses of laminated asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install first and remaining courses of three-tab-strip asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- E. Fasten asphalt shingle strips with a minimum of six roofing nails, but not less than the number indicated in manufacturer's written instructions for roof slope and design wind speed indicated on Drawings and for warranty requirements specified in this Section.
1. Locate fasteners in accordance with manufacturer's written instructions.
- F. Closed-Cut Valleys: Extend asphalt shingle strips from one side of valley 12 inches beyond center of valley.
1. Use one-piece shingle strips without joints in valley.
 2. Fasten with extra nail in upper end of shingle. Install asphalt shingle courses from other side of valley and cut back to a straight line 2 inches short of valley centerline.
 3. Trim upper concealed corners of cut-back shingle strips.
 4. Do not nail asphalt shingles within 6 inches of valley center.
 5. Set trimmed, concealed-corner asphalt shingles in a 3-inch-wide bed of asphalt roofing cement.
- G. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing-shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds.
1. Fasten with roofing nails of sufficient length to penetrate sheathing.
 2. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 073113

SECTION 073129 - WOOD SHINGLES AND SHAKES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood-shingle siding.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring.
2. Section 062013 "Exterior Finish Carpentry" for wood exterior-wall trim.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Wood-shingle siding.
2. Drainage mat.

B. Shop Drawings: For metal flashing and trim.

C. Samples: For each exposed product, in sizes indicated.

1. Wood-Shingle Siding: Full size

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Research Reports: For wood products, from ICC-ES, indicating that product is suitable for intended use under applicable building codes.

C. Sample Warranty: For manufacturer's materials warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wood products to include in maintenance manuals.

B. Materials warranties.

C. Roofing Installer's warranty.

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1.5 QUALITY ASSURANCE

- A. Installer Qualifications: CSSB member.
- B. Grading Agency Qualifications: An independent testing and inspecting agency recognized by authorities having jurisdiction as qualified to label wood products for compliance with referenced grading rules.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.
- B. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.
- C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing Work is not in progress.
- D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.
 - 1. Install self-adhering, polymer-modified bitumen sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.8 WARRANTY

- A. Materials Warranty: Manufacturer's warranty administered by CSSB and on CSSB's standard form in which manufacturer agrees to repair or replace CSSB-labeled products that fail in materials within specified warranty period. Material failures include manufacturing defects that result in leaks.
 - 1. Materials Warranty Period: Limited lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of product from single source from single manufacturer.

2.2 WOOD SHINGLE SIDING

- A. Cedar Shingles: Rebutted and rejointed, smooth-sawn eastern white cedar shingles.
 - 1. Grade: Grade B Clear, Red Label.
 - 2. Size: 16 inches long, 0.40 inch thick.
 - 3. Hip and Ridge Units: Site made.
 - 4. Finish: Factory applied to match existing.
 - 5. Available Products:
 - a. Maibec Industries, Inc.

2.3 UNDERLAYMENT MATERIALS

- A. Felt: Asphalt-saturated organic felts, nonperforated and complying with the following:
 - 1. ASTM D4869/D4869M: Type II, 30 lb..

2.4 DRAINAGE MATERIAL

- A. Drainage Material: Product shall maintain a continuous open space between water-resistive barrier and exterior cladding to create a drainage plane and shall be used under siding.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advanced Building Products; Mortairvent® 202.
 - b. Benjamin Obdyke: Cedar Breather.
 - c. CavClear/Archovations, Inc.; Rainscreen Mat. (.25")
 - d. Keene Building Products; Driwall™ Rainscreen 020-1.
 - e. Stuc-O-Flex International, Inc.; WaterWay Rainscreen, 7 mm.

2.5 ACCESSORIES

- A. Siding Nails: ASTM F 1667, stainless-steel, Type 304, wire nails, sharp pointed, and of sufficient length to penetrate a minimum of 3/4 inch into sheathing.
 - 1. Shingles: Use box nails.
 - 2. Nails in Contact with Metal Flashing: Use nails made from same metal as flashing.

2.6 METAL FLASHING AND TRIM

- A. Flashing: Provide aluminum flashing at window and door heads and where indicated.
 - 1. Finish for Aluminum Flashing: Siliconized polyester coating, same color as wood trim.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provisions have been made for flashings and penetrations through wood roofing.
 - 3. Verify that vent stacks and other penetrations through roofing are installed and securely fastened.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 DRAINAGE MATERIAL INSTALLATION

- A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

3.3 INSTALLATION OF WOOD SHINGLE SIDING

- A. Install wood shingles, beginning at base of wall, with a double-layer starter course in a continuous straight line. Offset joints of double-layer starter course a minimum of 1-1/2 inches.
 - 1. Extend starter course 1 inch below top of foundation wall.
- B. Install first course of wood shingles over starter course. Install second and succeeding courses of wood shingles. Offset joints between shingles in succeeding courses a minimum of 1-1/2 inches.
 - 1. Install shingles in continuous straight-line courses.
 - 2. Space shingles 1/8 to 1/4 inch apart.
 - 3. Fasten each shingle with two concealed nails spaced 3/4 to 1 inch from edge of shingle and 1 inch above butt line of succeeding course. For shingles wider than 8 inches, add two concealed fasteners, spaced 1 inch apart, to the center of shingle. Drive fasteners flush with top surface of shingles without crushing wood.
 - 4. Maintain weather exposure to match existing shingles.
 - 5. Interior Corner Treatment: Butted against wood stop.
 - 6. Exterior Corner Treatment: Butted against corner boards.

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C. Weather Exposure and Spacing: Match existing.

END OF SECTION 073129

SECTION 074113.16 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Standing-seam metal roof panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include project specific fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.4 CLOSEOUT SUBMITTALS

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

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.
- E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

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- a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
1. Uplift Rating: UL 90.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 STANDING-SEAM METAL ROOF PANELS

- A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
1. Aluminum Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1637.
- B. Vertical-Rib, Field-Lock, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ATAS International, Inc.: 1-1/2" Field-Lok System.
 - b. Englert: A1300 System.
 - c. Firestone Metal Products, LLC.: UC-3.

- d. Imetco; Twin Lok 1.5.
 - e. Merchant & Evans; Zip Rib 1-1/2" Zip Lok.
 - f. Pac-Clad; PAC 150 180° Double Lock.
2. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: 0.032 inch.
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish: Two-coat fluoropolymer.
 - d. Color: As selected by Architect from manufacturer's full range.
 3. Clips: Two-piece floating to accommodate thermal movement.
 - a. Material: 0.0250-inch- thick, stainless steel sheet.
 4. Panel Coverage: 16 inches.
 5. Panel Height: 1.5 inch.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
 1. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970.
 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Residential; a division of Carlisle Construction Materials; CCW WIP 300HT.
 - b. Grace Construction Products; W.R. Grace & Co. -- Conn.; Ice & Water Shield HT.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC.; MetShield.

2.4 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or

premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Gutters: Refer to Section 076200 "Sheet Metal Flashing and Trim."
- D. Downspouts: Refer to Section 076200 "Sheet Metal Flashing and Trim."
- E. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- F. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.5 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.

4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.6 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Aluminum Panels and Accessories:
 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions for seacoast and severe environments.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
 2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.3 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Apply over the entire roof surface.

3.4 INSTALLATION OF STANDING SEAM METAL ROOF PANELS

- A. Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

- B. Fasteners:

1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 4. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
 - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.

- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

- H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof-edge drainage systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

B. Shop Drawings: For roof specialties.

1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
3. Detail termination points and assemblies, including fixed points.
4. Include details of special conditions.

C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

D. Samples for Verification:

1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

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1.5 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.6 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 ROOF-EDGE DRAINAGE SYSTEMS

- A. Gutters: Manufactured in uniform section lengths not exceeding 12 feet, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
 - 1. Aluminum Sheet: 0.040 inch thick.
 - 2. Gutter Profile: Style K according to SMACNA's "Architectural Sheet Metal Manual."

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3. Corners: Factory mitered and mechanically clinched and sealed watertight.
 4. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.
- B. Downspouts: Plain round complete with mitered elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Formed Aluminum: 0.032 inch thick.
- C. Conductor Heads: Manufactured conductor heads, each with flanged back and stiffened top edge, and of dimensions and shape indicated, complete with outlet tube that nests into upper end of downspout.
1. Formed Aluminum: 0.032 inch thick.
- D. Aluminum Finish: Two-coat fluoropolymer.
1. Color: As selected by Architect from manufacturer's full range.

2.3 MATERIALS

- A. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
- B. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Aluminum Sheet Finishes:

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1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 4. Torch cutting of roof specialties is not permitted.
 5. Do not use graphite pencils to mark metal surfaces.
- B. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
 1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

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- C. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- D. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- E. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.3 INSTALLATION OF ROOF-EDGE DRAINAGE-SYSTEM

- A. Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 24 inches apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
 - 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion-joint caps.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
 - 1. Provide elbows at base of downspouts at grade to direct water away from building.
- D. Conductor Heads: Anchor securely to wall with elevation of conductor top edge 1 inch below gutter discharge.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.
 - c. Penetrations in smoke barriers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer. Provide a list of at least 3 completed projects with name and contact information for contractor.

B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A person experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted

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in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Special Inspections: Allow for 1 of each type of firestopping system to be removed and inspected for conformance with approved submittals. All firestopping shall be inspected prior to the installation of ceilings.
- C. Above Ceiling review: Prior to the installation of ceilings, a review of construction completion shall be conducted for firestopping and other items that will not be visible when the ceilings have been installed.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."
 - 3) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Hilti, Inc.
 - d. RectorSeal.
 - e. Specified Technologies, Inc.
 - f. Tremco, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
- F. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
 4. Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
 5. Stack Fitting: ASTM A48/A48M, gray-iron, hubless-pattern wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
 6. Special Coating: Corrosion resistant on interior of fittings.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
1. Permanent forming/damming/backing materials.
 2. Substrate primers.
 3. Collars.
 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

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- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.
 - 2. Do not install identification on exposed finished wall locations.
 - 3. Provide statement of hour rating for wall assembly.
- B. Penetration Identification: Identify each penetration firestopping system with legible labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.

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- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Mildew-resistant joint sealants.
 - 3. Latex joint sealants.
 - 4. Sealant for wood framing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

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- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.

1.5 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Sealant Type 1: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DuPont; Dowsil 790.
 - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
 - c. Pecora Corporation; 890.

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- d. Sika Corporation, Construction Products Division; SikaSil-C990.
 - e. Tremco Incorporated; Spectrem 1.
 - B. Sealant Type 2: Not Used.
 - C. Sealant Type 3: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pecora Corporation; 301 NS (VOC 50).
 - b. Tremco Incorporated; Spectrem 800 (VOC 1).
 - D. Sealant Type 4: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant: ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DuPont; Dowsil 786(VOC 33) (Food)
 - b. GE Advanced Materials - Silicones; Sanitary SCS1700.
 - c. Tremco Incorporated; Tremsil 200 Sanitary (VOC 1).
 - E. Sealant Type 4A: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant: ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Provide elastomeric sealant NSF certified for end-use application indicated. Provide sealant that, when cured and washed, meets requirements of Food and Drug Administration's 21 CFR, Section 177.2600 for use in areas that come in contact with food.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DuPont; Dowsil 786(VOC 33) (Food)
 - b. Kason; 3700 Series Rubbaseal Silicone Sealant.
 - c. C. R. Larence Co.; CRL 33S Silicone (VOC 39).
- 2.3 LATEX JOINT SEALANTS
- A. Sealant Type 5: Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Sonolac (VOC 41).

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- b. Bostik, Inc.; Chem-Calk 600.
- c. Pecora Corporation; AC-20 (VOC 31).
- d. Sherwin-Williams 950A
- e. Tremco Incorporated; Tremflex 834.

2.4 SEALANT FOR WOOD FRAMING

- A. Sealant for Wood Framing: STPE, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Provide Prosoco R-Guard FastFlash® or equal.

2.5 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 SEALANT FOR WOOD FRAMING

- A. Refer to Drawing A500 and notes 1 and 3 under Airtight Approach for Continuous Air Barriers for locations of sealant application.

3.5 CLEANING

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

3.6 PROTECTION

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

3.7 JOINT-SEALANT SCHEDULE

- A. Exterior Isolation and Contraction Joints in Cast-in-place Concrete Slabs.
 - 1. Silicone Joint Sealant: Sealant Type 3.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Under Exterior Door Thresholds.
 - 1. Silicone Joint Sealant: Sealant Type 1.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Exterior Joints for Which No Other Sealant Type is Indicated.
 - 1. Silicone Joint Sealant: Sealant Type 1.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Interior Isolation and Contraction Joints in Cast-In-Place Concrete Slabs.
 - 1. Silicone Joint Sealant: Sealant Type 3.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Concealed Interior Perimeter Joints of Exterior Openings.
 - 1. Silicone Joint Sealant: Sealant Type 1.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Exposed Interior Perimeter Joints of Exterior Openings.
 - 1. Latex Joint Sealant: Sealant Type 5.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Perimeter Joints Between Interior Wall Surfaces and Frames of Interior Doors, Windows and Elevator Entrances.
 - 1. Latex Joint Sealant: Sealant Type 5.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- H. Vertical Joints on Exposed Surfaces of Interior Unit Masonry Walls.
 - 1. Latex Joint Sealant: Sealant Type 5.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

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- I. Joints between Plumbing Fixtures and Walls and Floors and Between Countertops and Walls.
 - 1. Silicone Joint Sealant: Sealant Type 4.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

- J. Interior Joints in Food Service Areas.
 - 1. Silicone Joint Sealant: Sealant Type 4A.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

- K. Interior Joints for Which No Other Sealant is Indicated.
 - 1. Latex Joint Sealant: Sealant Type 5.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

B. Related Requirements:

1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

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

1.3 COORDINATION

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

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.

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8. Details of accessories.
 9. Details of moldings, removable stops, and glazing.
- C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.
- B. Field quality control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Standard Steel Doors and Frames:
1. Ceco Door Products; an Assa Abloy Group company.
 2. Curries Company.
 3. de La Fontaine, Industries.
 4. J/R Metal Frames Manufacturing, Inc.
 5. Steelcraft; a division of Ingersoll-Rand.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.10 deg Btu/F x h x sq. ft. when tested according to ASTM C518.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
 - 1. Full hinge cut-outs for non-handed doors will not be acceptable.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B..
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Bevel lock and hinge edges 1/8 inch in 2 inches.
 - f. Core: Manufacturer's standard.
 - g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener or laminated mineral board core for fire-rated doors.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.042 inch.
 - b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Knocked down.
 - 3. Exposed Finish: Prime.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors: SDI A250.8, Level 3; SDI A250.4, Level A.

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1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Bevel lock edge 1/8 inch in 2 inches.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - a. Core: Manufacturer's polyurethane core.
 - b. Fire-Rated Core: Manufacturer's standard vertical steel stiffener with insulation or laminated mineral board core for fire-rated doors.
2. Exposed Finish: Prime.

C. Maximum-Duty Door Frames: SDI A250.8, Level 4; SDI A250.4, Level A.

1. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A60 coating.
 - b. Construction: Face welded.
2. Exposed Finish: Prime.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 2. Compression Type for Drywall Slip-on Frames: Not allowed.
 3. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 4. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
 1. Wipe Coat Galvanneal materials will not be considered acceptable.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Spray Foam Insulation: Refer to Section 072100 "Thermal Insulation."
- H. Glazing: Comply with requirements in Section 088000 "Glazing."

2.7 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 - 1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 - 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 - 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
- C. Field apply bituminous coating to backs of frames that will be filled with grout or located in exterior walls. Also apply bituminous coating to the bottom of the floor anchor plates that are in contact with the concrete floor or foundation.

- D. Apply spray foam insulation in exterior door frames, including sidelights, mullions and transoms, prior to frame installation. Fill frame and cut off excess to allow for installation and final filling of voids with spray foam insulation as indicated below.

3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames according to NFPA 80.
 - 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - 5. Exterior Hollow Metal Door Frames: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces. Prior to installing frames, pre-fill frames with spray foam insulation around frame as indicated on the drawings. Voids around installed frames to be foamed as specified in Section 072100 "Thermal Insulation."
 - 6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.

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- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Five-ply flush wood veneer-faced doors for transparent finish.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Factory-machining criteria.
5. Factory- finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Dimensions and locations of blocking for hardware attachment.
5. Dimensions and locations of mortises and holes for hardware.
6. Clearances and undercuts.
7. Requirements for veneer matching.
8. Doors to be factory finished and application requirements.

C. Samples for Initial Selection: Stains for factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.

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1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Flush Wood Doors:
 - a. Eggers Industries.
 - b. Graham Wood Doors; an Assa Abloy Group company.
 - c. Marshfield –Algoma; a Masonite Architectural company.
 - d. VT Industries Inc.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
 - 1. Include all requirements as part of the door construction per Category “A” guidelines.”
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
 - 1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.4 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors:
 - 1. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
 - 2. ANSI/WDMA I.S. 1A Grade: Premium.
 - 3. Faces: Single-ply wood veneer not less than 1/50 inch thick.
 - a. Species: Select white birch.

- b. Cut: Plain sliced (flat sliced).
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Balance match.
 - e. Pair and Set Match: Provide for doors hung in same opening.
4. Exposed Vertical Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
- a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.
5. Core for Non-Fire-Rated Doors: ANSI A208.1, Grade LD-2 particleboard.
- a. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 - b. Provide doors with WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for the following:
 - 1) Doors indicated to receive exit devices in Section 087100 "Door Hardware."
 - 2) Doors where oversized glass lites exceed more than 40 percent of the door surface area.
 - 3) Doors where louvers exceed more than 40 percent of the door surface area.
 - 4) Screw Withdrawal, Door Face: 550 lbf.
 - 5) Screw Withdrawal, Vertical Door Edge: 550 lbf.
6. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
- a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 LIGHT FRAMES

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

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1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

- B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

- B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

- C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated. Attach wood rectangular glazing beads flush with door face. Apply shims and sealant as required to set glazing.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.7 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

- B. Factory finish doors.

- C. Transparent Finish:

1. ANSI/WDMA I.S. 1A Grade: Premium.

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2. Finish: ANSI/WDMA I.S. 1A TR-4 Conversion Varnish or TR-6 Catalyzed Polyurethane.
3. Staining: As selected by Architect from manufacturer's full range.
4. Effect: Open-grain finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 1. Install fire-rated doors and frames in accordance with NFPA 80.
 2. Install smoke- and draft-control doors in accordance with NFPA 105.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Folding stairway.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - d. Karp Associates, Inc.
 - e. Larsens Manufacturing Company.
 - f. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 - g. Nystrom, Inc.
 - h. Williams Bros. Corporation of America (The).
2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: Wall.
4. Door Size: Indicated on the drawing.
5. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Cam latch, screwdriver operated.

2.2 FIRE-RATED FOLDING STAIRWAY

- A. Provide Fire-Rated Access Door with Integral Folding Stairway, by Precision Ladders, LLC or approved substitute.
- B. Door: 20 gauge steel door attached to frame with continuous steel piano hinge and is flush with the bottom of the frame when in the closed position.
- C. Stairway:
 - 1. Stringers
 - a. 6005-T5 Extruded aluminum channel 5" X 1" X 1/8"
 - b. Tri-fold design
 - c. Steel blade type hinges
 - d. Adjustable foot with plastic Mar-guard.
 - e. Pitch 63 degrees.
 - 2. Treads
 - a. 6005-T5 Extruded aluminum channel 5 3/16" X 1 1/4" X 1/8".
 - b. Depth 5 3/16".
 - c. Width 30 inches.
 - d. Deeply serrated top surface.
 - e. Riser height as required.
 - f. 500 lbs load rating.
- D. Frame:
 - 1. Custom fabricated from 1/8" steel with factory-installed tread(s) to cover the distance from finished ceiling to finished floor above. Frame shall be on a 63 degree angle on the hinge end in order to continue the climb from ceiling and beyond on the same incline as the folding portion of the unit. The frame shall have pre-drilled and mounted brackets to allow for hanging from and fastening to the floor above.
- E. Hardware:
 - 1. Steel blade type hinge connecting stringer sections, zinc-plated and chromate-sealed, bolted to stringers.
 - 2. Steel operating arms, both sides, zinc-plated and chromate-sealed.
 - 3. Double acting steel springs and V-hooks, both sides.
 - 4. Rivets rating at 1175# shear.
- F. Safety:
 - 1. Steel bar handrail riveted to stringers, upper section, both sides standard.
 - 2. Other locations optional
 - 3. Steel section alignment clips at stringer section joints.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Aluminum Extrusions: ASTM B221, Alloy 6063.
- D. Aluminum Sheet: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- E. Frame Anchors: Same material as door face.
- F. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

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PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

SECTION 083613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes electrically operated sectional doors.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied finishes.
 - 1. Include Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Flat door sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranties: For special warranties.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.4 CLOSEOUT SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Failure of components or operators before reaching required number of operation cycles.
 - c. Faulty operation of hardware.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
 - e. Delamination of exterior or interior facing materials.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain sectional doors from single source from single manufacturer.
 - 1. Obtain operators and controls from sectional door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 - 1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
 - 2. Testing: According to ASTM E330 or DASMA 108 for garage doors and complying with the acceptance criteria of DASMA 108.
 - 3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.
 - a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door width.
 - b. Deflection of horizontal track assembly shall not exceed 1/240 of the door height.
 - 4. Operability under Wind Load: Design overhead coiling doors to remain operable under uniform pressure (velocity pressure) of 20 lbf/sq. ft. wind load, acting inward and outward.

2.3 DOOR ASSEMBLY

- A. Steel Sectional Door: Sectional door formed with hinged sections.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Clopay Building Products; Model 3730.
 - b. Overhead Door Corporation; Thermacore 850 Series.
 - c. Raynor: ThermaSeal TM320.
 - d. Richards-Wilcox, Inc.; Thermatite T300.
- B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.
- D. Minimum R-Value: 25 deg F x h x sq. ft./Btu.
- E. Steel Sections: Zinc-coated (galvanized) steel sheet with G60 zinc coating.
 - 1. Minimum Section Thickness: 3 inches.
 - 2. Exterior-Face, Steel Sheet Thickness: 0.019-inch- nominal coated thickness.
 - a. Surface: Flat.
 - b. Surface: Manufacturer's standard, ribbed.

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3. Insulation: Foamed in place.
 4. Interior Facing Material: Zinc-coated (galvanized) steel sheet with a nominal coated thickness of 0.019 inch.
- F. Track Configuration: Standard-lift track.
- G. Weatherseals: Fitted to bottom and top and around entire perimeter of door.
- H. Windows: Approximately 24 by 11 inches, with square corners, and spaced apart the approximate distance as indicated on Drawings; in two rows at height indicated on Drawings; installed with glazing of the following type:
1. Insulating Glass: Manufacturer's standard.
- I. Roller-Tire Material: Case-hardened steel.
- J. Counterbalance Type: Torsion spring.
- K. Electric Door Operator:
1. Usage Classification: Heavy duty, up to 25 cycles per hour and more than 90 cycles per day.
 2. Operator Type: Trolley.
 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
 4. Motor Exposure: Interior, clean, and dry.
 5. Emergency Manual Operation: Chain type.
 6. Obstruction-Detection Device: Automatic photoelectric sensor.
 7. Control Station: Interior-side mounted.
 8. Other Equipment: Portable, radio-control system.
- L. Door Finish:
1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.
 2. Finish of Interior Facing Material: Match finish of exterior section face.
- 2.4 MATERIALS, GENERAL
- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 2.5 STEEL DOOR SECTIONS
- A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A653/A653M, with indicated zinc coating and thickness.
1. Fabricate section faces from single sheets to provide sections not more than 24 inches high and of indicated thickness. Roll horizontal meeting edges to a continuous,

- interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.
2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch-nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch-thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.
 - C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.
 - D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
 - E. Provide reinforcement for hardware attachment.
 - F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.
 - G. Interior Facing Material: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A653/A653M, with indicated thickness.
 - H. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

2.6 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's standard, 3 inch, galvanized-steel track system of configuration indicated, designed for lift type indicated and clearances indicated on Drawings, Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.
 1. Galvanized Steel: ASTM A653/A653M, minimum G60 zinc coating.
 2. Slope tracks at an angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.
 3. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.
 - a. For Vertical Track: Continuous reinforcing angle attached to track and attached to wall with jamb brackets.

- b. For Horizontal Track: Continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.
- B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.
- C. Windows: Manufacturer's standard window units of type, size, and in arrangement indicated. Set glazing in vinyl, rubber, or neoprene glazing channel for metal-framed doors and elastic glazing compound for wood doors, as required. Provide removable stops of same material as door-section frames.

2.7 HARDWARE

- A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch-nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible. Provide double-end hinges where required, for doors more than 16 feet wide unless otherwise recommended by door manufacturer.
- C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch-diameter roller tires for 3-inch-wide track.

2.8 LOCKING DEVICES

- A. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.9 COUNTERBALANCE MECHANISM

- A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A229/A229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.
- B. Weight Counterbalance: Counterbalance mechanism consisting of filled pipe weights that move vertically in a galvanized-steel weight pipe. Connect pipe weights with cable to weight-cable drums mounted on torsion shaft made of steel tube or solid steel.
- C. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.

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Provide one additional midpoint bracket for shafts up to 16 feet long and two additional brackets at one-third points to support shafts more than 16 feet long unless closer spacing is recommended by door manufacturer.

- D. Cables: Galvanized-steel, multistrand, lifting cables with cable safety factor of at least 5 to 1.
- E. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- F. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- G. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
 - 1. Trolley: Trolley operator mounted to ceiling above and to rear of door in raised position and directly connected to door with drawbar.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
 - 1. Electrical Characteristics:
 - a. Phase: Single phase.
 - b. Volts: 115 V.
 - c. Hertz: 60.
 - 2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

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3. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
 5. Use adjustable motor-mounting bases for belt-driven operators.
- E. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."
1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- K. Portable, Radio-Control System: Consisting of two of the following for each door:
1. Three-channel universal coaxial receiver to open, close, and stop door.
 2. Portable control device to open and stop door may be momentary-contact type; control to close door shall be sustained- or constant-pressure type.
 3. Remote antenna and mounting kit.

2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

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- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks:
 - 1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches apart.
 - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install automatic garage doors openers according to UL 325.

3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

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2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.
- D. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A780/A780M.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

SECTION 085200 - WOOD WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes vinyl-clad wood windows.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.
- B. Shop Drawings: For wood windows.
 - 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples for Verification: For wood windows and components required, prepared on Samples of size indicated below:
 - 1. Exposed Finishes: 2 by 4 inches.
 - 2. Exposed Hardware: Full-size units.
- D. Product Schedule: For wood windows. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.
 - 1. Large Multiple Window Unit Applications: Provide integral structural metal reinforcement approved by licensed Engineer.
- C. Sample Warranties: For manufacturer's warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.

- C. Sample Installation: Install one window, including at least two mulled windows if specified, to demonstrate installation procedures, the interrelationship of different materials and trades, and to complete window testing. The three window shall be installed in different wall types, including as applicable brick, metal siding and cement board. Verify locations with Architect at Pre-installation Conference. Install to comply with the following requirements, using materials indicated for the completed Work:
1. Coordinate the presence of the Architect, Owner, Superintendent, third party inspectors, window manufacturer's representative and installer, sealant installers and air barrier manufacturer's representative and installer at all Installation Review Steps and Testing. Coordinate the additional presence of the exterior cladding installer at the final Installation Review Step.
 2. Installation Review Steps and Testing: Provide a schedule to Architect for review and agreement prior to starting work. For all three windows, Steps 1 and 2 shall be reviewed on the same date, Step 3 on the second date and Step 4 at a later date.
 - a. Step 1: Inspect and discuss the condition of substrate and other preparatory work performed by other trades.
 - b. Step 2: Assemble and install and flash receptor and subsill kit.
 - c. Step 3: Install and flash window. Do not install interior or exterior finishes.
 - d. Step 4: Complete exterior cladding for review.
 3. Approval of sample is for relationship of window with air barrier installation; weather and watertightness; and aesthetic qualities of workmanship.
 4. Approved sample may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 10 years from date of Substantial Completion.
 - c. Vinyl Cladding: Lifetime warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wood windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: LC.
 - 2. Minimum Performance Grade: 40.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.31.

2.3 WOOD WINDOWS

- A. Vinyl-Clad Wood Windows:
 - 1. Andersen Commercial Group; Andersen Corporation. 400 Series.
- B. Operating Types: Provide the following operating types in locations indicated on Drawings:
 - 1. Double hung, awning, gliding and fixed.
- C. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide; water-repellent preservative treated.
 - 1. Exterior Finish: Vinyl-clad wood.
 - a. Color: As selected by Architect from manufacturer's full range.
 - 2. Interior Finish: Unfinished.
 - a. Exposed Unfinished Wood Surfaces: Pine.
- D. Glazing System: Manufacturer's standard Low-E4 factory-glazing system that produces weathertight seal.

- E. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
 - 1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- F. Projected Window Hardware:
 - 1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
 - a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
 - 2. Hinges: Manufacturer's standard type for sash weight and size indicated.
 - 3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to 29 inches tall and two arms on taller sashes.
- G. Hung Window Hardware:
 - 1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
 - 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
 - 3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
 - 4. Handles: Applied sash lift on bottom rail of forward placed operating sash; one per sash.
- H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 - 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 - 1. Type and Location: Full, inside for project-out; full, outside for double-hung; not required for sliding sashes.

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- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 - 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 - 2. Finish for Interior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.
 - 3. Finish for Exterior Screens: Matching color and finish of cladding.
- C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.
 - 1. Mesh Color: Manufacturer's standard.

2.5 FABRICATION

- A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze wood windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Factory Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
 - 1. Seal joints between mulled units and provide a full-width vinyl flashing cap at the head of the mulled unit to prevent air and water infiltration.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

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- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Field Muller Units: Follow manufacturer's guidelines for mulled units along with manufacturer's recommendations for reinforcing of units.
 - 1. Seal joints between mulled units and provide a full-width vinyl flashing cap at the head of the mulled unit to prevent air and water infiltration.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install membrane strip flashing in accordance with manufacturer's recommendations and details on the drawings.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085200

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:
 - a. Swinging doors.
2. Electrified door hardware.

B. Related Sections:

1. Section 081113 "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
2. Section 081416 "Flush Wood Doors" for integral intumescent seals provided as part of labeled fire-rated assemblies.

1.2 COORDINATION

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
 1. Wiring Diagrams: For power, signal, and control wiring and including the following:

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- a. Details of interface of electrified door hardware and building safety and security systems.
 - b. Schematic diagram of systems that interface with electrified door hardware.
 - c. Point-to-point wiring.
 - d. Risers.
 - e. Elevations doors controlled by electrified door hardware.
2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- C. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.
1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.
 - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- D. Other Action Submittals:
1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
 - c. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - d. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - 5) Fastenings and other pertinent information.
 - 6) Explanation of abbreviations, symbols, and codes contained in schedule.

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- 7) Mounting locations for door hardware.
 - 8) List of related door devices specified in other Sections for each door and frame.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For electrified door hardware, from the manufacturer.
 1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- B. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- C. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
 1. For door hardware, an Architectural Hardware Consultant (AHC) who is also an Electrified Hardware Consultant (EHC) or Architectural Openings Consultant (AOC).
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- D. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." In addition to Owner Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware

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Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Address for delivery of keys.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 2. Warranty does not include the following:
 - a. Removal of components.
 - b. Reinstallation of components.
 3. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Exit Devices: Two years from date of Substantial Completion.
 - b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design" ICC A117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
 - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 - 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in Part 3 "Door Hardware Sets" Article.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.4 HINGES, GENERAL

- A. Quantity: Provide the following, unless otherwise indicated:
1. Two Hinges: For doors with heights up to 60 inches.
 2. Three Hinges: For doors with heights 61 to 90 inches.
 3. Four Hinges: For doors with heights 91 to 120 inches.
 4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Weight: Unless otherwise indicated, provide the following:
1. Entrance Doors: Heavy-weight hinges.
 2. Doors with Closers: Antifriction-bearing hinges.
 3. Interior Doors: Antifriction-bearing hinges.
- D. Hinge Base Metal: Unless otherwise indicated, provide the following:
1. Exterior Hinges: Stainless steel, with stainless-steel pin.
 2. Interior Hinges: Steel, with steel pin.
 3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.
- E. Hinge Options: Where indicated in door hardware sets or on Drawings:
1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors and outswinging corridor doors with locks.
 2. Corners: Square.
- F. Fasteners: Comply with the following:
1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.

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2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors and wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

G. Electrical Transfer Devices: Comply with the following:

1. Available Products:
 - a. Architectural Builders Hardware Mfg. Inc. (ABH); PT1000.
 - b. Securitron: Model EL-EPT.

2.5 HINGES

- A. Butts and Hinges: BHMA A156.1.
- B. Template Hinge Dimensions: BHMA A156.7.
- C. Available Manufacturers:
 1. Hager Companies (HAG).
 2. McKinney Products Company; an ASSA ABLOY Group company (MCK).
 3. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
- D. The following is a guide for hinge size and type required for this project.

	Manufacturer	Interior:	Exterior
1-3/4" Doors up to 3'-0" wide	Stanley	FBB179-4 1/2"	FBB191-4 1/2"
	Hager	BB1279-4 1/2"	BB1191-4 1/2"
	McKinney	TA-TB2714-4 1/2"	TA-TB2314-4 1/2"
1-3/4" Doors over 3'-0" wide	Stanley	FBB168-4 1/2"	FBB199-4 1/2"
	Hager	BB1168-4 1/2"	BB1199-4 1/2"
	McKinney	T4A-T4B3786-4 1/2"	T4A-T4B3386-4 1/2"

2.6 MECHANICAL LOCKS AND LATCHES, GENERAL

- A. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 1. Bored Locks: Minimum 1/2-inch latchbolt throw.
 2. Mortise Locks: Minimum 3/4-inch latchbolt throw.
- B. Lock Backset: 2-3/4 inches, unless otherwise indicated.
- C. Lock Trim:
 1. Levers: Cast.
 2. Escutcheons (Roses): Forged.

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3. Operating Device: Lever with escutcheons (roses).

D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

2.7 MORTISED LOCKS AND LATCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mechanical Locks and Latches:
 - a. Best Lock Corporation (BLC).
 - b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
 - c. Sargent Manufacturing Company; an Assa Abloy Group company (SGT).
 - d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).

B. Mortise Locks: Stamped steel case with steel or brass parts; BHMA Grade 1; Series 1000.

1. Provide one of the following manufacturers and designs:
 - a. Best 40H Series
 - b. Corbin/Russwin ML2000 Series
 - c. Sargent 8200 Series
 - d. Schlage L9000 Series

C. Lock Trim: Comply with the following:

1. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
 - a. Best, 14 design
 - b. Corbin/Russwin, Newport design
 - c. Sargent, LNL design
 - d. Schlage, 06A design

D. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

FUNCTION	SARGENT	SCHLAGE	CORBIN/RUSSWIN	BEST
A (utility)	04	80	57	EW
B (office)	05	50	51	E
C (passage)	15	10	10	N
D (classroom)	37	70	55	J
E (entrance)	16	60	42	F

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F (privacy)	65	40	30	LF
I (elec clsm)	71	80PEU	930	EWEU

2.8 BORED LOCKS AND LATCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mechanical Locks and Latches:

- a. Best Lock Corporation (BLC).
- b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
- c. Sargent Manufacturing Company; an Assa Abloy Group company (SGT).
- d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).

B. Bored Locks: BHMA Grade 1; Series 4000.

1. Provide one of the following manufacturers and designs:

- a. Best: 9K Series
- b. Corbin Russwin: CL3300 Series.
- c. Sargent: 10 Line
- d. Schlage: ND Series

C. Auxiliary Locks: BHMA Grade 1.

D. Lock Trim: Comply with the following:

1. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:

- a. Best: 15 C
- b. Corbin Russwin: NZD
- c. Sargent: LL
- d. Schlage: Rhodes

E. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

FUNCTION	SARGENT	SCHLAGE	CORBIN/RUSWIN	BEST
(1) (utility)	04	80	57	D
(2) (office)	05	53	51	AB
(3) (passage)	15	10	10	N
(4) (classroom)	37	70	55	R
(5) (entrance)	16	60	72	C
(6) (privacy)	65	40	20	L

2.9 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.
 - 1. Available Manufacturers:
 - a. Door Controls International (DCI).
 - b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - c. Rockwood.
 - 2. Available Products for Hollow Metal Doors:
 - a. Door Controls: 780.
 - b. Glynn-Johnson: FB6.
 - c. Rockwood: 555.
 - 3. Available Products for Wood Doors:
 - a. Door Controls: 790.
 - b. Glynn-Johnson: FB6W.
 - c. Rockwood: 557.

2.10 EXIT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Sargent Manufacturing Company; an Assa Abloy Group company (SGT).
 - 2. Von Duprin; an Ingersoll-Rand Company (VD).
- B. Products: All exit devices for this project shall be one of the following:
 - 1. The 80 Series exit device by Sargent & Co.
 - 2. 98 Series by Von Duprin Division
- C. Exit Devices: BHMA A156.3, Grade 1.
- D. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
- E. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

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- F. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- G. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- H. Outside Trim: Pull with cylinder; material and finish to match locksets, unless otherwise indicated.
- I. Through Bolts: For exit devices and trim on metal doors and fire-rated wood doors.
- J. The following functions shall be required where specified:

FUNCTION	VON DUPRIN	SARGENT
A	CD98NL-OP	16-8804
F	98L-F	12-8813ET

2.11 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 - 1. Manufacturer: Same manufacturer as for locking devices.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are face finished to match lockset.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

2.12 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
 - 1. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 - b. Re-key Owner's existing master key system into new keying system.
 - 2. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: Information to be furnished by Owner.

2. Quantity: In addition to one extra key blank for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.

2.13 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Burns Manufacturing Incorporated.
 - b. Don-Jo Mfg., Inc.
 - c. Hager Companies.
 - d. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - e. Rockwood Manufacturing Company; an ASSA ABLOY Group company.
 - f. Trimco.
- B. Door Pulls, 1 inch diameter.
 1. Size: ADA compliant, unless indicated otherwise, provide 10 inches center to center, with 3 1/2 inch projection and 2 1/2 inch clearance.
 2. Available Products:
 - a. Hager Companies, H4J.
 - b. IVES Hardware; an Ingersoll-Rand Company; 8103EZ.

2.14 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Surface-Mounted Closers:
 - a. LCN Closers; an Ingersoll-Rand Company (LCN).
 - b. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
- C. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
 1. Comply with the following maximum opening-force requirements:

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- a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- D. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
- E. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- 1. LCN:
 - a. Exterior: 4040 Series
 - b. Interior: 4040 Series
 - 2. Sargent:
 - a. Exterior: 281
 - b. Interior: 281

2.15 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Architectural Builders Hardware Mfg. Inc. (ABH); 2400 Series
 - b. Norton Door Controls: 6900 Series
 - c. Rixson-Firemark: 990 Series
 - d. Sargent: 1500 Series

2.16 MECHANICAL STOPS AND HOLDERS

- A. Stops and Bumpers: BHMA A156.16, Grade 1.
- 1. Provide wall stops for doors unless floor or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.
 - 2. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening.

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In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.

- B. Wall Stops: Wall type bumpers with concealed type flange shall be used where ever possible.
 - 1. Available Products:
 - a. Ives - 407 1/2
 - b. Door Controls - 3211T
 - c. Rockwood - 409
- C. Floor Stops: Where wall type bumpers cannot be used, provide dome type, floor mounted stops of the proper height as follows:
 - 1. Available Products:
 - a. Ives - 436, 438
 - b. Door Controls - 3310X, 3320X
 - c. Rockwood - 440, 442
- D. Exterior doors striking masonry and doors specified to have door stops and holders, shall have cast bronze wall or floor type door stops with hook or staple type holders to selectively hold doors in open position. The following will be acceptable:
 - 1. Available Products:
 - a. Ives - 445, 446
 - b. Door Controls - 3237X, 3347X
 - c. Rockwood - 473, 477
- E. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch; fabricated for drilled-in application to frame.

2.17 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- B. Weatherstripping:
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Basis-of-Design Product, No. 137SA by National Guard Products or approved substitute.
 - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed. Basis-of-Design Product, No. 137SA Set by National Guard Products or approved substitute.
 - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed. Basis-of-Design Product, No. 95WH by National Guard Products or approved substitute.

- C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke-labeled gasketing on fire-rated doors and on smoke-labeled doors. Basis-of-Design Product, No. 5050 by National Guard Products or approved substitute.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Basis-of-Design Product, No. 129NA by National Guard Products or approved substitute.
 - 2. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed. Basis-of-Design Product, No. 220NA by National Guard Products or approved substitute.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

2.18 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. National Guard Products, Inc.
 - b. Pemko Manufacturing Co.
 - c. Reese Enterprises, Inc.
 - d. Zero International, Inc.
- B. Basis-of-Design Product: Provide No. 896 with door bottom sweep No. 95WH by National Guard Products or approved substitute.

2.19 PLASTIC DOOR-PROTECTION PLATES

- A. Refer to Section 102600 “Wall and Door Protection.”

2.20 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and

hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.21 FINISHES

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

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1.	Butts and Hinges:	26D
2.	Locks & Lock Trim:	26D
3.	Exit Devices:	32D
4.	Door Controls - Closers:	Sprayed Alum. Finish
5.	Mortise Locks & Latches:	26D
6.	Door Stops	26D/32D
7.	Weatherstripping	Aluminum
8.	Threshold	Aluminum
9.	Kickplates	32D
10.	Pulls	32D

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated on Drawings or to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

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- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying schedule.
- E. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- F. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- G. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- H. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- I. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.

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

3.7 DOOR HARDWARE SETS

- A. The hardware sets listed below indicate the items of hardware required for each opening. It is the bidder's responsibility to accurately furnish the proper quantities, items, sizes, weights and functions as required by the plans and specifications. If an opening has, through error, been omitted from the following hardware sets, it shall be the bidder's responsibility to supply hardware of equivalent quality and quantity, as that which is specified for a comparable opening.

SINGLE OUTSIDE DOOR

HW1

Doors 17

Continuous gear hinge
Exit Device (function A) (outside pull)
Closer
Trilogy Prox Lock (by Owner)
Weatherstripping
Door Bottom Sweep
Kickplate
Threshold

Description of Operation: Door to unlock from outside with use of card reader or fob by others, or with use of key. Egress from door at all times.

JANITOR, ELECTRICAL, MECHANICAL, EMR

HW2

Doors 11, 23, 35

Hinges
Closer
Lockset (utility function 1)
Kick plate
Wall stop
Smoke gasketing

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PRIVATE TOILET

HW3

Doors 22, 26, 34

Hinges

Lockset (privacy function 6)

Wall Stop

Silencers

SLEEP

HW4

Doors 20, 21, 24, 25

Hinges

Lockset (privacy function 6)

Wall Stop

Sound gasketing

SINGLE FIRE RATED CORRIDOR OR ASSEMBLY EXIT

HW5

Doors 10, 39

Hinges

Closer

Exit Device (function F)

Kickplate

Wall Stop

Smoke gasketing

SINGLE FIRE RATED CORRIDOR OR ASSEMBLY EXIT

HW6

Doors 18, 38

Hinges

Closer

Exit Device (function F)

Trilogy Prox Lock (by Owner)

Kickplate

Wall Stop

Smoke gasketing

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Description of Operation: Door to unlock from outside with use of card reader or fob by others, or with use of key. Egress from door at all times.

DOUBLE CLOSET DOORS

HW7

Doors 29, 30

Hinges

Pulls

Magnetic Catch

OFFICE OR STORAGE (no smoke seals)

HW8

Doors 03, 09, 12, 13, 14, 16, 28, 32, 37

Hinges

Lockset (classroom function 4)

Door Stop

Silencers

HW9

Doors 01, 02, 04, 19, 33, 36,

Hinges

Trilogy Prox Lock (by Owner)

Door Stop

Silencers

Description of Operation: Door to unlock from outside with use of card reader or fob by others, or with use of key. Egress from door at all times.

HW10

Doors 31

Hinges

Lockset (classroom function 4)

Door Stop

Sound gasketing

MOUNT DESERT FIRE DEPARTMENT – STATION #1

LAUNDRY - HALL

HW11

Doors 15, 27

Hinges

Lockset (passage function 3)

Door Stop

Silencers

EXISTING DOORS

Doors E1, E2, E3, E4, E5, E6

Trilogy Prox Lock (by Owner)

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass for doors and interior borrowed lites.
 - 2. Glazing sealants and accessories.
- B. Related Requirements:
 - 1. Section 088813 "Fire-Rated Glazing."

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

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

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For glass.
- B. Product Test Reports: For insulating glass, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 FIELD CONDITIONS

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

1.9 WARRANTY

- A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written

instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 1. GANA Publications: "Glazing Manual."
 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum.
 - 1. Minimum Glass Thickness for Exterior Lites: 6 mm.
 - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

2.4 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190.
 - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 - 2. Perimeter Spacer: Aluminum with mill or clear anodic finish.
 - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. DuPont; Dowsil 790.
- b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
- c. May National Associates, Inc.; Bondaflex Sil 290.
- d. Pecora Corporation; 890.
- e. Sika Corporation, Construction Products Division; SikaSil-C990.
- f. Tremco Incorporated; Spectrem 1.

2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.

- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 SEALANT GLAZING (WET)

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

3.6 CLEANING AND PROTECTION

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

3.7 MONOLITHIC GLASS SCHEDULE

- A. Tempered Glass: Clear fully tempered float glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required.
 - 3. Application: All interior glass, unless noted otherwise.

3.8 INSULATING GLASS SCHEDULE

A. Insulated Glass: Low-E-coated, clear insulating glass.

1. Basis-of-Design Product: Vitro Architectural Glass; Solarban 70.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Annealed float glass.
 - a. Fully tempered where required by code.
5. Interspace Content: Argon.
6. Indoor Lite: Annealed float glass.
 - a. Fully tempered where required by code.
7. Low-E Coating: Pyrolytic or sputtered on second and third surface.
8. Winter Nighttime U-Factor: 0.28 maximum.
9. Summer Daytime U-Factor: 0.26 maximum.
10. Visible Light Transmittance: 64 percent minimum.
11. Solar Heat Gain Coefficient: 0.27 maximum.
12. Safety glazing where required.
13. Application: All exterior glass, unless noted otherwise.

END OF SECTION 088000

SECTION 088813 - FIRE-RATED GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire-protection-rated glazing.

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.

1.3 COORDINATION

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

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of glass and glazing product, from manufacturer.
- B. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

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1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during the remainder of the construction period.

1.9 WARRANTY

- A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

- 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."

B. Safety Glazing Labeling: Permanently mark glazing with certification label of the Safety Glazing Certification Council, the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

A. Float Glass: ASTM C1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

2.5 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 257 or UL 9, including the hose-stream test, and shall comply with NFPA 80.

1. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.

B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether or not glazing has passed the hose-stream test; whether or not glazing meets 450 deg F (250 deg C) temperature-rise limitation; and the fire-resistance rating in minutes.

C. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. InterEdge, Inc., a subsidiary of AFG Industries, Inc.; Pyrobel.
- b. Safti First; SuperLite II-XLM
- c. Pilkington Group Limited (distributed by Technical Glass Products); PyroStop.
- d. Vetrotech Saint-Gobain; SGG Contraflam N2.

2. Fire-Protection Rating: 60 minutes.

3. Thickness: As required by product and fire-protection rating.

2.6 GLAZING ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- C. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 GLAZING, GENERAL

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

- G. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

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

3.5 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.6 FIRE-PROTECTION-RATED GLAZING SCHEDULE

- A. Fire Rated Glass Type 2: 60-minute fire-protection-rated glazing with 450 deg F temperature-rise limitation; laminated glass with intumescent interlayers.

END OF SECTION 088813

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Grid suspension systems for gypsum board ceilings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- C. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
 - b. Chicago Metallic Corporation; Drywall Grid System.
 - c. USG Corporation; Drywall Suspension System.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum board, Type X.
2. Mold-resistant, glass-mat, gypsum board.
3. Interior trim.
4. Sound-attenuation blankets.
5. Acoustical sealant.

B. Drawings: Submit drawings indicating locations of control joints.

C. Samples for Verification: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

1. Room temperature shall be maintained at not less than 40 °F (4 °C) during application of gypsum board except when adhesive is used for the attachment of gypsum board. For the bonding of adhesive, joint treatment, texturing, and decoration, the room temperature shall be maintained at not less than 50 °F (10 °C) for 48 h prior to application and continuously thereafter until completely dry.
2. When a temporary heat source is used, the temperature shall not exceed 95 °F (35 °C) in any given room or area.

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3. Adequate ventilation shall be maintained in the working area during installation and curing period.
 4. Gypsum board shall be protected from direct exposure to rain, snow, sunlight, or other excessive weather conditions.
 5. Where manufacturers' recommendations differ from the above, follow their recommendations.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned with air barrier system, roofing and windows installed.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Gypsum.
 2. CertainTeed Corp.
 3. Georgia-Pacific Gypsum LLC.
 4. Lafarge North America Inc.
 5. National Gypsum Company.
 6. PABCO Gypsum.
 7. Temple-Inland.
 8. USG Corporation.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.3 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.

2.5 SPECIALTY GYPSUM BOARD

- A. Mold-Resistant, Glass-Mat Interior Gypsum Board: ASTM C1658/C1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Georgia-Pacific Building Products; DensArmor Plus Fireguard.
 - b. National Gypsum Company; Gold Bond® Brand eXP Fire-Shield Interior Extreme Gypsum Panel.
 - 2. Core: 5/8 inch, Type X.
 - 3. Long Edges: Tapered.
 - 4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
 - 1. Material:
 - a. Galvanized or aluminum-coated steel sheet or rolled zinc.
 - b. Trim-Tex, Super Seal Tear Away™ L Bead where abutting exterior metal doors and windows.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. Expansion (control) joint. Similar to ClarkDietrich vinyl 093 control joint.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

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1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

2.8 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- D. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation; AC-20 FTR or AIS-919.
 - b. USG Corporation; SHEETROCK Acoustical Sealant.
- E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- F. Vapor Retarder: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

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

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

- J. Fire-Resistance-Rated Gypsum Board Assemblies: Provide fire-resistive joint system at the top of fire-resistance-rated gypsum board assemblies. Provide firestop system around any structural penetration of wall assembly.
- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Vertical and horizontal surfaces unless otherwise indicated.
 - 2. Mold-Resistant, Glass-Mat Interior Type: As indicated on Drawings.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying face layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

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- B. Control Joints: Install control joints at locations indicated on approved Shop Drawings.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use where indicated.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish interior panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Not applicable.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - 5. Level 5: At exposed surfaces of glass-mat faced panels..
- E. Glass-Mat Faced Panels: Finish to level 5.

3.6 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before installing gypsum board ceilings, Contractor shall conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected and Architect has had the opportunity to confirm deficiencies have been corrected.
 - 1. Complete the following in areas to receive gypsum board ceilings:
 - a. Installation, insulation, and leak and pressure testing of water piping systems.
 - b. Installation of air-duct systems.
 - c. Installation of air devices.
 - d. Installation of mechanical system control-air tubing.
 - e. Installation of ceiling support framing.
 - f. Installation of Penetration Firestopping.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- C. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.

1.4 CLOSEOUT SUBMITTALS

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

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 ACOUSTICAL PANEL CEILING (APC)

- A. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Armstrong World Industries, Inc.; Fine Fissured No. 1732.
 - 2. BPB USA; HHF-154.
 - 3. USG Interiors, Inc.; Radar ClimaPlus No. 2220.
- B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
 - 1. Type and Form: Type III, mineral base with painted finish; Form 1, nodular or 2, water felted.
 - 2. Pattern: CE (perforated, small holes and lightly textured) and I (embossed).
- C. Color: White.
- D. LR: Not less than 0.80.
- E. NRC: Not less than 0.55.
- F. CAC: Not less than 35.
- G. Edge/Joint Detail: Beveled tegular.

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- H. Thickness: 5/8 inch.
- I. Modular Size: 24 by 24 inches.
- J. Antimicrobial Treatment: Broad spectrum fungicide and bactericide based.

2.3 ACOUSTICAL CEILING PANELS (ACT)

- A. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Armstrong: Lyra PB Direct Apply.
- B. Provide panels to sizes and configurations indicated.
- C. Surface Texture: Smooth
- D. Composition: Fiberglass Plant Based
- E. Color: White (WH).
- F. Edge Profile: Square Edge, Painted Edge
- G. Noise Reduction Coefficient(NRC): 0.80 installed with A mounting (direct to hard surface)
- H. Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton 190
- I. Flame Spread: ASTM E 1264; Class A (UL)
- J. Light Reflectance (LR) White Panel: ASTM E 1477; 0.88
- K. Dimensional Stability: HumiGuard Plus
- L. Recycle Content: Up to 71% recycled content. (Pre-consumer, post-consumer and post industrial)
- M. Mounting Style: “A” Adhered to suitable substrate.

2.4 METAL SUSPENSION SYSTEM FOR APC

- A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
 - 1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C635/C635M.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong World Industries, Inc.; Prelude 15/16" Exposed Tee System (7300 Series).
 - b. CertainTeed Corporation; S11 System.
 - c. Chicago Metallic Corporation; 1200 System.
 - d. United States Gypsum Company; DX 24 System.
 2. Structural Classification: Intermediate-duty system.
 3. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 4. Face Design: Flat, flush.
 5. Cap Material: Cold-rolled steel.
 6. Cap Finish: Painted white.
- C. Direct-Mount Ceiling Grid: provide Armstrong Easy Up Tracks and Clips or approved substitution.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Hangers shall be single lengths of wire without splices; coordinate lengths in deep ceiling cavities.
 - 2. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 5. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger

- involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 8. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 9. Do not attach hangers to steel deck tabs.
 10. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 11. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 12. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs acoustical panel ceilings, conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of acoustical panels until deficiencies have been corrected.

- 1. Complete the following in areas to receive acoustical panel ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of Penetration Firestopping Systems.

3.6 CLEANING

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

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermoset-rubber base.
 - 2. Rubber stair accessories.
 - 3. Resilient molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.
- D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.5 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.

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2. During installation.
 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Tarkett (Johnsonite); Baseworks Thermoset Rubber Base.
- B. Product Standard: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
1. Style and Location:
 - a. RWB1: Style C, Butt to: Millworks Silhouette MW-XX-J.
 - b. RWB2: Style B, Cove; Provide in areas noted in the Finish Schedule.
- C. Thicknesses: 0.125 inch.
1. RWB1: 0.250 inch.
 2. RWB2: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths:
1. RWB1: Cut lengths 96 inches long.
 2. RWB2: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors: Sandalwood 45.

2.2 RUBBER STAIR ACCESSORIES (RT1)

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

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- B. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Nora (RT1): Norament Round Stair Treads with visually impaired strips.
- C. Stair Treads: ASTM F2169.
 - 1. Type: TS (rubber, vulcanized thermoset).
 - 2. Class: 2 (pattern; embossed, grooved, or ribbed).
 - 3. Group: 2 (with contrasting color for the visually impaired).
 - 4. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
 - 5. Nosing Height: Manufacturer's standard.
 - 6. Thickness: 1/4 inch and tapered to back edge.
 - 7. Size: Lengths and depths to fit each stair tread in one piece.
 - 8. Integral Risers: Smooth, flat; in height that fully covers substrate.
- D. Landing Tile (RFT1): Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
- E. Riser and Tread Fillers: Provide Tarkett Subfloor Leveling System components to fill the riser space below the existing nosing to comply with details. Also use Subfloor Leveling System to level the top tread to surrounding floor surface.
- F. Colors and Patterns: Slate blue.

2.3 RESILIENT MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Tarkett (Johnsonite).
- B. Profile and Dimensions:
 - 1. Transition Strip between Sheet Flooring and VCT: CD-XX-C by Johnsonite or approved substitute.
 - 2. Reducer Strip between Concrete and VCT: RRS-XX-C by Johnsonite or approved substitute.
- C. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- D. Epoxy Adhesives: Two-part epoxy compound recommended by resilient tread manufacturer to adhere rubber treads and risers to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.
 - 3. At outside corners or bullnose CMU corners with less than 6 inches of length, provide contact or epoxy cement to hold base tight to wall.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Vinyl sheet flooring with backing.
 - 2. Linoleum sheet flooring with backing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient sheet flooring.
 - 1. Include sheet flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.
- C. Samples for Initial Selection: For each type of resilient sheet flooring indicated.
- D. Samples for Verification: For each type of resilient sheet flooring, in manufacturer's standard size, but not less than 6-by-9-inch sections of each color, texture, and pattern required.
 - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.
- E. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- F. Product Schedule: For resilient sheet flooring. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Resilient Sheet Flooring: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive resilient sheet flooring during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 VINYL SHEET FLOORING WITH BACKING (RSF2)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Altro Group: Altro Aquarius.
- B. Product Standard: ASTM F1303.
 - 1. Type (Binder Content): Type I, minimum binder content of 90 percent.
 - 2. Wear-Layer Thickness: Grade 1.
 - 3. Overall Thickness: 2.0 mm.
 - 4. Backing Class: Class A (fibrous).
- C. Wearing Surface: Embossed.
- D. Sheet Width: 6'-7".
- E. Seamless-Installation Method: Heat welded.
- F. Colors and Patterns: Tarrapin AQI12009.

2.2 VINYL SHEET FLOORING WITH BACKING (RSF3)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Altro Group: Operetta.
- B. Product Standard: ASTM F1303.
 - 1. Type (Binder Content): Type I, minimum binder content of 90 percent.
 - 2. Wear-Layer Thickness: Grade 1.
 - 3. Overall Thickness: 2.0 mm.
 - 4. Backing Class: Class B (nonfoamed plastic).
- C. Wearing Surface: Smooth.
- D. Sheet Width: 6'-7".
- E. Seamless-Installation Method: Chemical weld.
- F. Colors and Patterns: Madrigal OP2134.

2.3 LINOLEUM SHEET FLOORING WITH BACKING (RSF1)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Marmoleum by Forbo: Fresco.
- B. Composition: Linseed oil, wood flour, rosin binders and dry pigments.
- C. Overall Thickness: As standard with manufacturer.
- D. Backing: Jute.
- E. Wearing Surface: Smooth.
- F. Sheet Width: As standard with manufacturer.
- G. Seamless-Installation Method: Chemically welded.
- H. Colors and Patterns: Sage 3891.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions equal to or less than 90% RH.
- C. Seamless-Installation Accessories:
 1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
 - a. Colors: As selected by Architect from manufacturer's full range to contrast with flooring.
 2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SUBSTRATE TESTING

- A. General: Conduct testing using an independent agency with a minimum of five years' experience in moisture emission testing or as pre-approved by the manufacturer of the flooring material.
- B. Moisture Emission Testing: Conduct moisture emission testing of concrete slabs-on-grade and elevated slabs to receive floor coverings or coatings by the calcium chloride test method. Perform tests in accordance with ASTM F-1869.
 - 1. Conduct a minimum of three tests for the first 1,000 sq. ft. and one additional test for each additional 1,000 sq. ft.
 - 2. Ambient test environment shall conform to ASTM-1869 and be reflective of the building's normal operational environment.
 - 3. Conduct tests on bare concrete, free of surface contaminants, adhesives, curing compounds or sealers.
 - 4. Locate test locations a minimum of five feet from exterior walls or interior walls that penetrate the floor. Do not conduct tests over random cracks or within five feet of control or construction joints.
 - 5. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
- C. Internal Relative Humidity Testing: Conduct internal relative humidity testing of concrete slabs-on-grade and elevated slabs to receive floor coverings or coatings in accordance with ASTM F-2170.
 - 1. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- D. Surface Alkalinity Testing: Conduct alkalinity testing of the concrete surface at all moisture emission test locations in accordance with ASTM F710 5.3.1.
- E. Submit all test results to the Architect, flooring installer and manufacturer of the flooring materials before installation of the flooring materials.

3.3 PREPARATION

- A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

- D. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.4 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
 - 1. Maintain uniformity of flooring direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
 - 3. Match edges of flooring for color shading at seams.
 - 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.
- H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Seamless Installation:
 - 1. Heat-Welded Seams: Comply with ASTM F1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.
 - 2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid vinyl floor tile.
 - 2. Rubber floor tile.
 - 3. Vinyl composition floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient floor tile.
 - 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.
- C. Samples for Initial Selection: For each type of floor tile indicated.
- D. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- E. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Testing Agency Qualifications: Provide statement that independent agency has a minimum of five years of experience in moisture emission testing or as pre-approved by the manufacturer of the flooring material.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

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1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
 1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. Beginning 48 hours after installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 SOLID VINYL FLOOR TILE (LVT)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the following or approved substitution.
 1. Armstrong Biome Montane.
- B. Tile Standard: ASTM F1700.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Class: Class III, Printed Film Vinyl Tile.
2. Type: B, Embossed Surface.

- C. Thickness: 0.100 inch.
- D. Size: 6 by 48 inches.
- E. Color and Pattern: Kilimanjaro ST252.

2.2 RUBBER FLOOR TILE (RFT1)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Nora Systems, Inc.; Norament 926/825 Round.
- B. Tile Standard: ASTM F1344, Class I-A, Homogeneous Rubber Tile, solid color.
- C. Hardness: Grade 1, minimum hardness of 85, measured using Shore, Type A durometer according to ASTM D2240.
- D. Wearing Surface: Molded pattern.
1. Molded-Pattern Figure: Raised discs.
- E. Thickness: 0.130 inch.
- F. Size: 19.72 inches by 19.72 inches.
- G. Colors and Patterns: Slate blue.

2.3 RUBBER FLOOR TILE (RFT2)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Nora Systems, Inc.; Norament 992 Grano.
- B. Wearing Surface: Molded pattern.
1. Molded-Pattern Figure: Hammered.
- C. Thickness: 0.36 inch.
- D. Size: 39.45 inches by 39.45 inches.
- E. Colors and Patterns: Spikenard.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions equal to or less than 90% RH.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SUBSTRATE TESTING

- A. General: Conduct testing using an independent agency with a minimum of five years' experience in moisture emission testing or as pre-approved by the manufacturer of the flooring material.
- B. Moisture Emission Testing: Conduct moisture emission testing of concrete slabs-on-grade and elevated slabs to receive floor coverings or coatings by the calcium chloride test method. Perform tests in accordance with ASTM F-1869.
 - 1. Conduct a minimum of three tests for the first 1,000 sq. ft. and one additional test for each additional 1,000 sq. ft.
 - 2. Ambient test environment shall conform to ASTM-1869 and be reflective of the building's normal operational environment.
 - 3. Conduct tests on bare concrete, free of surface contaminants, adhesives, curing compounds or sealers.
 - 4. Locate test locations a minimum of five feet from exterior walls or interior walls that penetrate the floor. Do not conduct tests over random cracks or within five feet of control or construction joints.
 - 5. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

- C. Internal Relative Humidity Testing: Conduct internal relative humidity testing of concrete slabs-on-grade and elevated slabs to receive floor coverings or coatings in accordance with ASTM F-2170.
 - 1. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- D. Surface Alkalinity Testing: Conduct alkalinity testing of the concrete surface at all moisture emission test locations in accordance with ASTM F710 5.3.1.
- E. Submit all test results to the Architect, flooring installer and manufacturer of the flooring materials before installation of the flooring materials.

3.3 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.4 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

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1. Lay RFT3 and LVT1 tiles with grain running in one direction.
 2. Lay VCT tiles with grain direction alternating in adjacent tiles (basket-weave pattern) in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
1. Remove adhesive and other blemishes from surfaces.
 2. Sweep and vacuum surfaces thoroughly.
 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish for VCT: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
1. Apply two coats.
- E. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes resinous flooring systems as shown on the drawings and in schedules.

1.2 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane based self-leveling seamless flooring system with Flintshot quartz aggregate broadcast with epoxy grout coat and urethane topcoat.
- B. The system shall have the color and texture as specified by the Owner with a nominal thickness of 3/16 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- C. Cove base (if required) to be applied where noted on plans and per manufacturers standard details unless otherwise noted

1.3 SUBMITTALS

- A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- B. Manufacturer's Material Safety Data Sheet (MSDS) for each product being used.
- C. Samples: A 3 x 3 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

1.4 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of 10 years of experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.
- B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified.
- C. No requests for substitutions shall be considered that would change the generic type of the specified System.
- D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.

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- E. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.
- F. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping:

- 1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.

B. Storage and Protection:

- 1. The Applicator shall be provided with a dry storage area for all components. The area shall be between 60 F and 85 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
- 2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the Engineer or other personnel.

C. Waste Disposal:

- 1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.6 PROJECT CONDITIONS

A. Site Requirements:

- 1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
- 2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
- 3. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new and existing concrete to be coated with cementitious urethane material.

- 1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of 14 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
- 2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
- 3. Sealers and curing agents should not to be used.
- 4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

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C. Safety Requirements:

1. Non-related personnel in the work area shall be kept to a minimum.

1.7 WARRANTY

- A. Dur-A-Flex, Inc. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
- B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

PART 2 - PRODUCTS

2.1 FLOORING

- A. Dur-A-Flex, Inc, Poly-Crete SLB (self-leveling broadcast quartz), seamless flooring system.
 1. System Materials:
 - a. Topping: Dur-A-Flex, Inc, Poly-Crete SL resin, hardener and SL aggregate.
 - b. The aggregate shall be Dur-A-Flex, Inc. Flintshot quartz aggregate.
 - c. Grout coat: Dur-A-Flex, Inc. Shop Floor, epoxy-based, two-component resin.
 - d. Topcoat: Dur-A-Flex, Inc. Armor Top resin and hardener and colorant.
 - e. Line Striping: Dur-A-Flex Inc. Dur-A-Gard resin and hardener with Super-Stick additive.
 2. Patch Materials
 - a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete MD (up to ¼ inch).
 - b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Poly-Crete WR.

2.2 MANUFACTURER

- A. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802
- B. Manufacturer of Approved System shall be single source and made in the USA.

2.3 PRODUCT REQUIREMENTS

- | | |
|---------------------|---------------|
| A. Topping | Poly-Crete SL |
| 1. Percent Reactive | 100 % |

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- | | | |
|----|---|---------------------------|
| 2. | VOC | 0 g/L |
| 3. | Bond Strength to Concrete ASTM D 4541 | 400 psi, substrates fails |
| 4. | Compressive Strength, ASTM C 579 | 9,000 psi |
| 5. | Tensile Strength, ASTM D 638 | 2,175 psi |
| 6. | Flexural Strength, ASTM D 790 | 5,076 psi |
| 7. | Impact Resistance @ 125 mils, MIL D-3134, | 160 inch lbs |
| | No visible damage or deterioration | |

B. Grout Coat Dur-A-Glaze Shop Floor

- | | | |
|-----|--|-----------------------|
| 1. | VOC | 8 g/L |
| 2. | Compressive Strength, ASTM D 695 | 17,500 psi |
| 3. | Tensile Strength, ASTM D 638 | 4,000 psi |
| 4. | Flexural Strength, ASTM D 790 | 6,250 psi |
| 5. | Flexural Modulus of Elasticity, ASTM D 790 | 6.2 x 10 ⁵ |
| 6. | Abrasion Resistance, ASTM D 4060 | |
| | CS17 Wheel, 1,000 gm load, 1,000 cycles | 24 mg loss |
| 7. | Flame Spread/NFPA-101, ASTM E 84 | Class A |
| 8. | Flammability, ASTM D 635 | Self Extinguishing |
| 9. | Indentation, MIL D-3134 | 0.025 Max |
| 10. | Impact Resistance MIL D-3134 | Pass |
| 11. | Water Absorption. MIL D-24613 | 0.04% |

C. Topcoat Armor Top

- | | | |
|----|---|---------------------------------|
| 1. | Percent Solids | 95 % |
| 2. | VOC | 0 g/L |
| 3. | Tensile Strength, ASTM D 2370 | 7,000 psi |
| 4. | Adhesion, ASTM 4541 | Substrate Failure |
| 5. | Hardness, ASTM D 3363 | >4H |
| 6. | 60 ⁰ Gloss ASTM D 523 | Satin: 50 +/-10 Gloss: 75 +/-10 |
| 7. | Abrasion Resistance, ASTM D4060 | Gloss Satin |
| | CS 17 wheel (1,000 g load) 1,000 cycles | 4 8 mg loss with grit |
| | | 10 12 mg loss without grit |
| 8. | Pot Life, 70 F, 50% RH | 45 Minutes |
| 9. | Full Chemical Resistance | 7 days |

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

A. General:

1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
 - a. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
 - b. If the relative humidity exceeds 99% then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
3. Mechanical surface preparation
 - a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 3-4 as described by the International Concrete Repair Institute.
 - b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
 - c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
 - d. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
4. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufacturer's recommendations.

3.3 APPLICATION

A. General:

1. The system shall be applied in four distinct steps as listed below:
 - a. Substrate preparation
 - b. Topping/overlay application with quartz aggregate broadcast.
 - c. Grout coat application
 - d. Topcoat application.

2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Topping:

1. The topping shall be applied as a self-leveling system as specified by the Architect. The topping shall be applied in one lift with a nominal thickness of 1/8 inch.
2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. SL Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
4. The topping shall be applied over horizontal surfaces using ½ inch “v” notched squeegee, trowels or other systems approved by the Manufacturer.
5. Immediately upon placing, the topping shall be degassed with a loop roller.
6. Quartz aggregate shall be broadcast to excess into the wet material at the rate of 0.6 lbs/sf.
7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

C. Grout Coat:

1. The topcoat shall be squeegee applied and back rolled with a coverage rate of 80-90 sf/gal.
2. The topcoat shall be comprised of a liquid resin and a liquid hardener that is mixed in the ratio of 1 part hardener to 2 parts resin and installed per the manufacturer's recommendations.

D. Top Coat:

1. The topcoat shall be roller applied with dip and roll method at 3 mils.
2. The topcoat shall be comprised of a liquid resin, hardener and colorant mixed per the manufacturer's instructions.
3. The finish floor will have a nominal thickness of 3/16 inch.

E. Flexible Joint Sealant:

1. Apply a flexible polyurea joint sealant in all construction and expansion joints according to manufacturers' guidelines. (Depth of joint sealant should be minimum of ¾")

F. Line Stripping:

1. Apply line stripe with Dur-A-Gard pigmented epoxy with Superstick Additive at 100 SF/gal.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection:

1. The following tests shall be conducted by the Applicator:

a. Temperature:

1) Air, substrate temperatures and, if applicable, dew point.

b. Coverage Rates:

1) Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.

B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 096723

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Galvanized metal.
 - 2. Synthetic siding and trim.
 - 3. Wood.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
 - 2. Section 055113 "Metal Pan Stairs" for shop priming metal grating stairs.
 - 3. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

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1. Submit Samples on rigid backing, 8 inches square.
 2. Apply coats on Samples in steps to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams “Custodian Project Color and Product Information” report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- B. Furnish extra materials, from the same product run, that match products installed and that opened and left over, and identified with labels describing contents.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced Applicator who has completed painting system applications similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. California Paints.
 - 3. PPG Architectural Finishes, Inc. (Pittsburgh Paints, Glidden Professional, Flood Stains)
 - 4. Sherwin-Williams Company (The).
- B. Products: Subject to compliance with requirements, provide one of the products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range.
 - 1. Allow for up to 5 different color selections.

2.3 METAL PRIMERS

- A. Galvanized Metal Primer: Factory-formulated galvanized metal primer for exterior application.
 - 1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04.
 - 2. Devoe Coatings: 4020-1000 Devflex 4020PF DTM Primer & Flat Finish. (91 g/L)
 - 3. Pittsburgh Paints: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel. (123 g/L)
 - 4. Sherwin-Williams; IMC DTM Acrylic Primer/Finish, B66W1. (150 g/L)

2.4 WOOD PRIMERS

- A. Exterior Latex Wood Primer: Factory-formulated acrylic wood primer for exterior application.
 - 1. Cal: Trouble-Shooter 100% Acrylic Latex Primer 45100.
 - 2. Glidden Professional; 6001-1200, Hydrosealer Primer Sealer. (100g/L)
 - 3. Moore; Super Spec Latex Exterior Primer #169.
 - 4. Pittsburgh Paints; 6-609 SpeedHide House and Trim Wood Primer Flat. (89 g/L)
 - 5. S-W: A-100 Exterior Latex Primer B42W41 Series. (87 g/L)

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- B. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint system indicated.

2.5 EXTERIOR LATEX PAINTS

A. Low-Luster Acrylic Latex Paint:

1. Cal: 100% Acrylic Latex House & Trim Paint, Eggshell Finish 40100.
2. Glidden Professional: 2412-XXXXV Ultrahide 150 Exterior Satin Paint. (50 g/L)
3. Moore: Super Spec Low Lustre Latex House Paint #185.
4. PPG: Speedhide Exterior Satin Latex, 6-2000XI Series. (<50 g/L)
5. S-W: SuperPaint Exterior Latex Satin, A89-100 Series. (49 g/L)

B. Semi-Gloss Acrylic Latex Paint:

1. Cal: 100% Acrylic Latex House & Trim Paint, Satin Gloss 40200.
2. Glidden Professional: 2416-XXXXV, Ultrahide 150 Exterior Semi-Gloss Paint. (50 g/L)
3. Moore: Super Spec Latex House & Trim Paint #170.
4. PPG: Speedhide Exterior Semi-Gloss Latex, 6-900XI Series. (<50 g/L)
5. S-W: SuperPaint Exterior Latex Gloss, A84 Series. (132 g/L)

C. Exterior Semi-Gloss Acrylic Enamel: Factory-formulated semi-gloss acrylic enamel for exterior application.

1. Benjamin Moore; DTM Acrylic Semi-Gloss Enamel M29: Applied at a dry film thickness of not less than 2.0 mils.
2. California Paints: Rust Stop DTM 100% Acrylic Semi-Gloss, 10XX.
3. Devco Coatings; 4216-XXXX, High Performance Waterborne Acrylic Semi-Gloss Enamel.
4. Pittsburgh Paints: 6-900XI Speedhide Exterior Semi-Gloss Latex: Applied at a dry film thickness of not less than 1.5 mils.
5. Sherwin-Williams; IMC DTM Acrylic Coating Semi-Gloss (Waterborne) B66W200 Series. (250 g/L)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Wood: 15 percent.
 2. Synthetic siding and trim: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- F. Synthetic Siding and Trim Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.

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5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tinting: Tint primer of colors such as reds, yellows, and oranges with a gray basecoat system designed to help provide color coverage.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces. When using colors such as red, yellow or orange, an extra coat of finish may be necessary. Notify Architect when additional coats do not fix the problem.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Pipe hangers and supports.
 - d. Metal conduit.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Galvanized-Metal Substrates: Hollow metal doors and frames.
 1. Acrylic Enamel Coating System:
 - a. Prime Coat: Primer, rust inhibitive, water based. Apply over shop primer.

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- b. Intermediate Coat: Acrylic enamel, matching topcoat.
- c. Topcoat: Acrylic enamel, semi-gloss (MPI Gloss Level 5).

B. Wood Substrates: Wood trim.

1. Acrylic Latex over Latex Primer System:

- a. Prime Coat: Primer, latex for exterior wood.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Acrylic Latex, exterior, semi-gloss (MPI Gloss Level 5).

C. Synthetic Siding and Trim Substrates:

1. Latex System:

- a. Prime Coat: By siding and trim manufacturer.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4).

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMUs).
 - 3. Steel.
 - 4. Gypsum board.
- B. Related Requirements:
 - 1. Section 055113 "Metal Pan Stairs" for shop priming metal pan stairs.
 - 2. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Indicate VOC content.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

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

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams “Custodian Project Color and Product Information” report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- B. Furnish extra materials, from the same product run, that match products installed and that opened and left over, and identified with labels describing contents.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Benjamin Moore & Co.
2. PPG Architectural Finishes, Inc. (Pittsburgh Paints, Glidden Professional, Flood Stains)
3. Sherwin-Williams Company (The).

B. Products: Subject to compliance with requirements, provide one of the products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. Material Compatibility:

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

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

1. Allow for the following Benjamin Moore color selections:
 - a. AF500 Atmospheric.
 - b. AF490 Tranquility.
 - c. AF685 Thunder.
 - d. HC36 Hepplewhite Ivory.
 - e. AF35 Vapor.
 - f. HC75 Valley Forge Brown.

2.3 BLOCK FILLERS

A. Latex Block Filler:

1. Devco Coatings: Bloxfil 4000-1000 Interior/Exterior Heavy Duty Acrylic Block Filler. (67 g/L)
2. Moore: Latex Block Filler No. M88.
3. PPG: 6-7 Speedhide Interior/Exterior Masonry Latex Block Filler. (<50 g/L)
4. S-W: PrepRite Block Filler Interior/Exterior Latex B25W25 Series. (45 g/L)

2.4 PRIMERS/SEALERS

A. Low-VOC Latex Primer/Sealer:

1. Moore: Ultra Spec 500 Interior Latex Primer, No. N534. (0 g/L)
2. Glidden Professional: 9116-1200 LifeMaster No VOC Interior Primer. (0 g/L)
3. PPG: Pure Performance Interior Latex Primer, 9-900 Series. (0 g/L)
4. SW: ProMar 200 Zero VOC Interior Latex Primer B28W02600 Series. (0 g/L)]

2.5 METAL PRIMERS

A. Rust-Inhibitive Primer (Water Based):

1. Glidden Professional: Devflex 4020PF DTM Primer & Flat Finish. (91 g/L)
2. Moore: IMC Acrylic Metal Primer M04. (51 g/L)
3. PPG: 90-712 Pitt-Tech Interior/Exterior Primer Finish DTM Industrial Enamel. (123 g/L)
4. S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer, B66-310 Series. (100 g/L)

2.6 LATEX PAINTS

A. Zero-VOC Latex (Flat):

1. Glidden Professional: 1209-XXXXN Ultra-hide No VOC Interior Flat Paint (0 g/L)
2. Moore: Ultra Spec 500 Interior Flat Finish, No. N536. (0 g/L)
3. PPG: 6-4110XI Series, Speedhide zero Interior Zero VOC Interior Flat Latex. (0 g/L)
4. SW: ProMar 200 Zero VOC Interior Latex Flat B30-2600 Series. (0 g/L)]

B. Zero -VOC Latex (Eggshell):

1. Glidden Professional: 9300-XXXX LifeMaster No VOC Interior Eggshell Paint (0 g/L)
2. Moore: Ultra Spec 500 Interior Eggshell Finish, No. N538. (0 g/L)
3. PPG: 1500-0100 Series, Ultra-Hide Zero Interior Latex Paint, Eggshell. (0 g/L)
4. SW: ProMar 200 Zero VOC Interior Latex Eg-Shell B20-2600 Series. (0 g/L)]

C. Zero -VOC Latex (Satin):

1. PPG: 1500-0100 Series, Ultra-Hide Zero Interior Latex Paint, Satin. (0 g/L)

D. Zero -VOC Latex (Semi-gloss):

1. Glidden Professional: 9200-XXXXN LifeMaster No VOC Interior Semi-Gloss Paint (0 g/L)
2. Moore: Ultra Spec 500 Interior Semi-Gloss Finish, No. N539. (0 g/L)
3. PPG: 1500-0100 Series, Ultra-Hide Zero Interior Latex Paint, Semi-Gloss. (0 g/L)
4. SW: ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series. (0 g/L)]

2.7 HIGH PERFORMANCE EPOXY PAINTS (EPT)

A. Waterborne Epoxy Finish:

1. Moore: Moorcraft Super Spec Acrylic Epoxy Coating No. 256.
2. PPG: 98-1 Aquapon WB Water Base Epoxy (250 g/L)
3. S-W: IMC Water Based Catalyzed Epoxy Gloss, B70 Series. (200 g/L)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMUs): 12 percent.
 - 3. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Existing Painted Surfaces: Remove any loose paint by scraping or sanding. Sand any rough or “orange peel” or crazing areas.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tinting: Tint primer of colors such as reds, yellows, and oranges with a gray basecoat system designed to help provide color coverage.
 - 1. Do not tint prime or base coat for multi-colored finishes.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces. When using colors such as red, yellow or orange, an extra coat of finish may be necessary. Notify Architect when additional coats do not fix the problem.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms: Not applicable.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.

- g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Low-Odor/VOC Latex System:
 - a. Block Filler: Block filler, latex, interior/exterior.
 - b. Intermediate Coat: Latex, interior, low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, low odor/VOC, semi-gloss (MPI Gloss Level 5).
- B. CMU Substrates:
 - 1. Low-Odor/VOC Latex System:
 - a. Block Filler: Block filler, latex, interior/exterior.
 - b. Intermediate Coat: Latex, interior, low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, low odor/VOC, semi-gloss (MPI Gloss Level 5).
 - 2. High-Performance Epoxy System: Walls as indicated.
 - a. Block Filler: Block filler, latex, interior/exterior.
 - b. Intermediate Coat: High performance epoxy, matching topcoat.
 - c. Topcoat: Latex, interior, high performance epoxy, semi-gloss (MPI Gloss Level 5).
- C. Steel Substrates: Hollow metal doors and frames, stair framing and railings.
 - 1. Low-Odor/VOC Latex System:

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- a. Prime Coat: Primer, rust inhibitive, water based.
 - b. Intermediate Coat: Latex, interior, low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, low odor/VOC, semi-gloss (MPI Gloss Level 5).
- D. Gypsum Board Substrates:
- 1. Low-Odor/VOC Latex System:
 - a. Prime Coat: Primer sealer, interior, low odor/VOC.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, flat (MPI Gloss Level 1) for ceilings.
 - d. Topcoat: Latex, interior, institutional low odor/VOC eggshell (MPI Gloss Level 3) for walls.
 - 2. High-Performance Epoxy System: Gypsum board walls and ceilings as indicated
 - a. Prime Coat: Primer sealer, interior, low odor/VOC.
 - b. Intermediate Coat: Interior, high performance epoxy, matching topcoat.
 - c. Topcoat: Interior, high performance epoxy, semi-gloss (MPI Gloss Level 5).

END OF SECTION 099123

SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and application of wood stains and transparent finishes on the following substrates:
 - 1. Interior Substrates:
 - a. Dressed lumber (finish carpentry or woodwork).
 - b. Windows.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Indicate VOC content.
- B. Samples for Initial Selection: For each type of product.
- C. Samples for Verification: For each type of finish system and in each color and gloss of finish required.
 - 1. Submit Samples on representative samples of actual wood substrates, 8 inches square or 8 inches long.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- D. Product List: Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams “Custodian Project Color and Product Information” report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- B. Furnish extra materials, from the same product run, that match products installed and that opened and left over, and identified with labels describing contents.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures less than 5 deg F above the dew point, or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Architectural Finishes, Inc. (Pittsburgh Paints, Glidden Professional, Flood Stains, Sikkens)
 - 3. Sherwin-Williams Company (The)
- B. Products: Subject to compliance with requirements, provide one of the products listed in wood finish systems schedules for the product category indicated.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

2.2 MATERIALS, GENERAL

A. Material Compatibility:

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

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

2.3 STAINS

A. Interior Wood Stain (Semitransparent):

1. PPG: Olympic Premium Interior Oil-Based Wood Stain 44500
2. Glidden Professional: 1700V, Woodpride Interior Wood Stain
3. S-W: Minwax Interior Oil Stain - 250 Formula, 7107/7108 Series.

2.4 WATER-BASED VARNISHES

A. Waterborne Clear Acrylic (Satin):

1. Ben Moore: Lenmar Aqua Plastic Waterborne Clear Satin, 1WB-1427.
2. PPG: Olympic 42786 Interior Acrylic Polyurethane Satin Clear Finish.
3. S-W: Minwax Polycrylic.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content, lighting levels and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Interior Wood Substrates: 10 percent, when measured with an electronic moisture meter.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with finish application only after unsatisfactory conditions have been corrected.
 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 - 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
 - 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 - 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
- D. Interior Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces exposed to view and dust off.
 - 3. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for finish and substrate indicated.
 - 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
 - 3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

- A. Wood Substrates: Wood trim and windows.
 - 1. Water-Based Varnish over Stain System:
 - a. Stain Coat: Stain, semitransparent, for interior wood.
 - b. First Intermediate Coat: Polyurethane varnish matching topcoat.
 - c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
 - d. Topcoat: Varnish, water based, clear, satin (MPI Gloss Level 4).
 - 2. Water-Based Varnish System:
 - a. Prime Coat: Polyurethane varnish matching topcoat.
 - b. Intermediate Coat: Polyurethane varnish matching topcoat.
 - a. Topcoat: Varnish, water based, clear, satin (MPI Gloss Level 4).

END OF SECTION 099300

SECTION 101400 - SIGNS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of signs:
 - 1. Panel signs.
 - 2. Exterior sign.

1.2 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: Show fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components.
 - 1. Provide message list for each sign required, including large-scale details of wording and lettering layout.
- C. Samples for Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available.

1.4 INFORMATION SUBMITTALS

- A. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- B. Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.
- C. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.
- D. Design Concept: The Drawings indicate sizes, profiles, and dimensional requirements of signs and are based on the specific types and models indicated. Sign units by other manufacturers may be considered provided deviations in dimensions and profiles do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

1.8 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

1.9 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

2.2 PANEL SIGNS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Mohawk Sign Systems.
 - 2. Welch Architectural Signage.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- B. Substrate: Fabricate signs from 1/8 inch thick matte clear acrylic with edges mechanically and smoothly finished to eliminate cut marks. Background color to be subsurface.
 - 1. Background Color: As selected by the Architect from manufacturer's standard colors.
 - 2. Edge Condition: Straight.
 - 3. Corner Condition: Rounded to 3/8 inch radius.
 - 4. Size: 6 by 6 inch, unless noted otherwise.
- C. Copy: Complying with ADA Accessibility Guidelines.
- D. Letterform: Route copy into face of substrate 1/32 inch deep. Chemically weld (inlay) computer precision cut tactile copy into routed letter openings so that tactile copy is embedded in substrate and remains at least 1/32" above surface of substrate.
 - 1. Height: 5/8 inch minimum letter height.
- E. Braille: Use engrave process for all Braille areas. Engrave Braille dots into surface of clear material.
- F. Symbols of Accessibility:
 - 1. Accessible elements: Provide international symbol of accessibility.
 - a. Provide male and female symbols as required for toilets.
 - 2. Elevators: Provide symbol containing person on stairs with flame.
- G. Provide characters complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille.

2.3 EXTERIOR SIGN

- A. Allow \$2,000 for exterior sign painted on 3/4 inch thick plywood with graphics as determined by the Architect.

2.4 ACRYLIC SHEET FINISHES

- A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- B. Verify that items are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
 - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 - 1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
 - 2. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

3.4 PANEL SIGN SCHEDULE

- A.

Types:	Sizes:	Quantity:
Toilet/Shower	Provide 8" x 7"	one for each room
Stairs	Provide 8" x 7"	one for each door to stair
Landings	Provide 18" x 18" (per Life Safety Code)	one for each landing
	Provide 4" x 4" (per ADA Code)	one for each landing
Exit	Provide 6" x 6"	one for each exit
- B. Rooms with more than one entrance door shall have a sign at each door.
- C. Final room names and numbers will be verified during the submittal.
- D. Allow for 100 informational signs, 7 by 7 inch, with minimum of 15 characters each and room number.

END OF SECTION 101400

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Corner guards.
 - 2. Door surface protection.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
 - 1. Include plans, elevations, sections, and attachment details.
- C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.
 - 1. Include Samples of accent strips and accessories to verify color selection.
- D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
 - 1. Corner Guards: 12 inches long. Include example top caps.
 - 2. Door-Surface Protection: 6 by 6 inches square.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of handrail.
- B. Material Certificates: For each type of exposed plastic material.
- C. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
 2. Keep plastic materials out of direct sunlight.
 3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
 - a. Store corner-guard covers in a vertical position.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.

- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

2.3 CORNER GUARDS

- A. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed or extruded metal with formed edges; with 90-degree turn to match wall condition.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Stainless Steel surface Mount Corner Guard by IPC or comparable product by one of the following:
 - a. Balco, Inc.
 - b. Construction Specialties, Inc.
 - c. Pawling.
 - d. Tepromark International, Inc.
 - 2. Material: Stainless steel, Type 304.
 - a. Thickness: Minimum 0.0500 inch.
 - b. Finish: Directional satin, No. 4.
 - c. Height: 4 foot.
 - 3. Wing Size: Nominal 2 by 2 inches.
 - 4. Corner Radius: 1/8 inch.
 - 5. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.

2.4 PLASTIC DOOR-PROTECTION PLATES

- A. General: Manufacturer's standard plastic products of thicknesses and sizes indicated.
 - 1. Fire-Rated Doors: Where the tops of door-protection plates indicated for field installation on fire-rated doors are more than 16 inches above the door bottoms, provide door-protection plates complying with NFPA 80 that are listed and labeled by a qualified testing and inspection agency acceptable to authorities having jurisdiction.
- B. Kick Plates: Minimum 0.040-inch wall thickness; beveled four sides.
 - 1. Size: 10 inches high by door width, with allowance for frame stops.
 - 2. Color and Texture: As selected by Architect from manufacturer's full range.
 - 3. Mounting: Countersunk screws through factory-drilled mounting holes.

2.5 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

2.6 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.7 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances, fire rating, and other conditions affecting performance of the Work.
- B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
 - 3. Adjust end and top caps as required to ensure tight seams.
- C. Fire Doors: Install protection according to the listing of each item.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

END OF SECTION 102600

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Custodial accessories.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

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

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in this section or substitute product by one of the following:
 - 1. A & J Washroom Accessories, Inc.
 - 2. American Specialties, Inc.
 - 3. Bradley Corporation.
 - 4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
- B. Toilet Tissue (Roll) Dispenser:
 - 1. Basis-of-Design Product: Bobrick No. B-6637.
 - 2. Description: Single-roll dispenser with reserve roll in recess.
 - 3. Mounting: Recessed mounted.
 - 4. Operation: Noncontrol delivery with standard spindle.
 - 5. Capacity: Designed for 4-1/2- or 5-inch-diameter tissue rolls.
 - 6. Material and Finish: Stainless steel, No. 4 finish (satin).
- C. Paper Towel (Folded) Dispenser:
 - 1. Basis-of-Design Product: Bobrick No. B-262.
 - 2. Mounting: Surface mounted.
 - 3. Minimum Capacity: 400 C-fold or 525 multifold towels.
 - 4. Material and Finish: Stainless steel, No. 4 finish (satin).
 - 5. Lockset: Tumbler type.
 - 6. Refill Indicators: Pierced slots at sides or front.
- D. Automatic Soap Dispenser:
 - 1. Basis-of-Design Product: GOJO TFX.
 - 2. Description: Automatic dispenser with infrared sensor to detect presence of hands; battery powered; designed for dispensing soap in lather form.
 - 3. Mounting: Surface mounted.
 - 4. Capacity: 1200 ml.
 - 5. Materials: ABS plastic.
 - 6. Refill Indicator: Sight window.
- E. Grab Bar:

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1. Basis-of-Design Product: Bobrick No. B-5806 Series.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Outside Diameter: 1-1/4 inches.
5. Configuration and Length: As indicated on Drawings.

F. Mirror Unit:

1. Basis-of-Design Product: Bobrick No. B-165.
2. Frame: Stainless-steel channel.
 - a. Corners: Mitered.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
 - b. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
4. Size: 24 by 36 inches.

2.2 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in this section or substitute product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bradley Corporation.
4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.

B. Shower Curtain Rod:

1. Basis-of-Design Product: Bobrick No. B-6047.
2. Description: 1-1/4-inch OD; fabricated from nominal 0.05-inch-thick stainless steel.
3. Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
4. Finish: No. 4 (satin).

C. Shower Curtain:

1. Basis-of-Design Product: Bobrick No. 204-2.
2. Size: Minimum 6 inches wider than opening by 72 inches high.
3. Material: Vinyl, minimum 0.006 inch thick, opaque, matte.
4. Color: White.
5. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

6. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

D. Soap Dish:

1. Basis-of-Design Product: Bobrick B-4380.
2. Mounting: Recessed mounted.
3. Material and Finish: Bright polished stainless steel.

E. Towel Pin:

1. Basis-of-Design Product: Bobrick B-7677.
2. Description: Projecting minimum of 4-3/8 inches from wall surface.
3. Material and Finish: Stainless steel, No. 4 finish (satin).

2.3 CUSTODIAL ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in this section or substitute product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bradley Corporation.
4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.

B. Mop and Broom Holder:

1. Basis-of-Design Product: Bobrick No. B-223 x 36.
2. Description: 0.0375-inch thick, stainless-steel hat channel with four spring-loaded, rubber, cam-type, mop/broom holders.
3. Length: 36 inches.
4. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Utility Shelf: for Laundry and Janitor.

1. Basis-of-Design Product: Griddmann REST-SHELF-GR42-SH1236.
2. Description: With exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf top.
3. Sizes: 36 inches long by 12 inches deep.
4. Material and Finish: Not less than nominal 0.05-inch thick stainless steel, No. 4 finish (satin).

2.4 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

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- B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- C. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
- D. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- E. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

B. Samples for Verification: For each type of exposed finish required, prepared on samples 6 by 6 inches square.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - b. Larsens Manufacturing Company.
 - c. Potter Roemer LLC.
- 2. Available Products: Subject to compliance with requirements, provide one of the following.
 - a. J.L. Industries: Cosmopolitan Series C8137F17.
 - b. Larsen's: Architectural Series SS 2409-6R.
 - c. Potter-Roemer: Alta Series 7062-A-4.

- B. Cabinet Construction: Nonrated.

- 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.

- C. Cabinet Material: Cold-rolled steel sheet.

- 1. Shelf: Same metal and finish as cabinet.

- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

- 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

- E. Cabinet Trim Material: Stainless steel sheet.

- F. Door Material: Stainless steel sheet.

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- G. Door Style: Fully glazed panel with frame.
- H. Door Glazing: Tempered float glass (clear).
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch.
 - 2. Provide continuous hinge, of same material and finish as trim,, permitting door to open 180 degrees.
- J. Accessories:
 - 1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet glazing.
 - 2) Application Process: Decals or pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.
- K. Materials:
 - 1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Color: White.
 - 2. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.
 - a. Finish: ASTM A480/A480M No. 4 directional satin finish,.
 - 3. Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Miter corners and grind smooth.
 - 3. Provide factory-drilled mounting holes.
 - 4. Prepare doors and frames to receive locks.

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5. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
 2. Fabricate door frames of one-piece construction with edges flanged.
 3. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at height indicated below:
 1. Fire-Protection Cabinets: 54 inches above finished floor to top of fire extinguisher.

- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
 - 2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
 - 1. Section 104413 "Fire Protection Cabinets."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International.
 - c. Badger Fire Protection.
 - d. Buckeye Fire Equipment Company.
 - e. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - f. Kidde Residential and Commercial Division.
 - g. Larsens Manufacturing Company.
 - h. Potter Roemer LLC.
 - 2. Valves: Manufacturer's standard.
 - 3. Handles and Levers: Manufacturer's standard.
 - 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INSTALLATION

- A. General: Install fire extinguishers in cabinets.

END OF SECTION 104416

SECTION 108000 - OTHER SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Automatic slide pole.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

PART 2 - PRODUCTS

2.1 AUTOMATIC SLIDE POLE

- A. Where indicated on the drawings, provide Model 23 Automatic Slide Pole by McIntite Brass Works, Inc.
- B. The Model 23 consists of a steel frame as shown, chrome plated bronze rails and gate arms surrounding a polished brass pole that extends from floor to ceiling. The above floor unit has stainless steel guarding below the rails and gate arms and a bronze ring that rests on the floor. Two fire-resistant doors are mounted in the steel frame which is suspended from the ceiling. There is an enclosed control unit mounted to the steel frame opposite the gates. This contains motor controllers and a small computer called a PLC. Two infrared sensors are mounted in the front of a small enclosure that is fastened to the stanchion across from the gates. The small enclosure also houses the on/off switch. The Model 23 is nominally left with the power on. The sensors in the small enclosure project a beam of light across the opening to two reflectors on the gate guards. When either gate is opened or a person is on the pole and blocks the beam, the beam is interrupted and the PLC actuates motors that drop the doors to the open position. The doors remain in the open position as long as there is a person at floor level on the pole or as long as the gates are open. After the gates close and a person has slid below the floor level on the pole, the controller waits 20 seconds and closes the doors. If another person slides down the pole during this period the timer is reset and the doors will remain open or slide open in mid cycle if need be. A temperature sensor located on the bottom of the frame will disable the operation of the pole if the temperature below the floor exceeds 180 degrees F.
- C. Slide Pole: The poles are available in any length. They are constructed of 2½" diameter 5/32" wall cold drawn brass tubing. Purchase of a Model 23 includes both a pole of specified length and a floor and ceiling flange as well as a 32" diameter foam landing mat.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

3.2 ADJUSTING AND CLEANING

- A. Adjust specialties for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

3.3 CLEANING

- A. Clean surfaces prior to inspection. Replace damaged or defective items.

END OF SECTION 108000

SECTION 111300 - LOADING DOCK EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Light-communication systems at overhead doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for stationary loading dock equipment.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For stationary loading dock equipment.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include details of equipment assemblies.
3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For stationary loading dock equipment to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of construction contiguous with stationary loading dock equipment.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 LIGHT-COMMUNICATION SYSTEMS

- A. General: Communication system consisting of signal-light sets, caution signs, alarms, and controls for each location indicated.
 - 1. Manufacturer: Subject to compliance with requirements, provide product by the following:
 - a. GateArms.com; LED-illuminated Door Safety Kit.
- B. Light Sets: Super-tough IP68-rated LED light strips, marine-grade wiring, and stainless steel hardware. Lights are Green when doors are fully open. Light length as required for door height.
- C. Controller: Custom controller designed to work with any photo-eye device.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical systems for loading dock equipment to verify actual locations of connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate size and location of loading dock equipment indicated to be attached to or recessed into concrete or masonry, and furnish anchoring devices with templates, diagrams, and instructions for their installation.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

3.3 INSTALLATION

- A. General: Install loading dock equipment as required for a complete installation.
 - 1. Rough-in electrical connections.

3.4 ADJUSTING

- A. Adjust loading dock equipment to function smoothly and safely, and lubricate as recommended by manufacturer.
- B. After completing installation of exposed, factory-finished loading dock equipment, inspect exposed finishes and repair damaged finishes.

3.5 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain loading dock equipment.

END OF SECTION 111300

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

D. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 3 inches square. Mark interior face of material if applicable.

E. Product Schedule: For roller shades. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material.

C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

- A. Roller Shade Hardware and Chain: Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Shade Cloth: Standard non-depreciating 10-year limited warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: Subject to compliance with requirements, provide MechoShade by MechoShade Systems, Inc., FlexShade as manufactured by Draper, Inc., or an approved substitute.
- B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Nickel-plated metal.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Clip, jamb mount.

- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Drive-End Location: Right side of interior face of shade.
 - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
 - 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- E. Shadebands:
 - 1. Shadeband Materials: Room darkening and light filtering.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.
- F. Installation Accessories:
 - 1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - a. Shape: L-shaped.
 - b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 3 inches.
 - 2. Endcap Covers: To cover exposed endcaps.
 - 3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Shade Cloth (Shade 1): EcoVeil group, 1350 Series, fabricated from TPO for both core yarn and jacket, single thickness, non-raveling 0.030 inch (0.762 mm) thick fabric.
 - 1. Fabric Width: As required for windows.
 - 2. Weave: 5 percent open 2 x 2 basket weave.
 - 3. Colors: As selected by Architect from manufacturer's full range
 - 4. Bottom Hem: Straight.

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- C. Room Darkening Shade Cloth (Shade 2): (PVC Free) Shadecloth with opaque acrylic backing; "Equinox 0100 series", .008 inches thick blackout material and weighing .94 lbs. per square yard, comprising of 53% fiberglass, 45% acrylic, 2% poly finish.
 - 1. Fabric Width: As required for windows.
 - 2. Colors: As selected by Architect from manufacturer's full range
 - 3. Bottom Hem: Straight.

- D. Light-Filtering Fabric (Draper) (Shade 1):
 - 1. Basis-of-Design: SheerWeave® Infinity 5%, as manufactured by Phifer.
 - a. Fabric Content and Structure: PVC-free, lead free, and 100 percent recyclable. Made from core yarn, synthetic or natural, that comes from post-industrial waste by product. 100 percent TPO composition.
 - b. Performance Characteristics:
 - 1) Flame retardant per NFPA 701.
 - 2) Bacteria and Fungi Resistant per ASTM E 2180.
 - 3) GREENGUARD Indoor Air Quality Certified®.
 - 4) GREENGUARD Children & Schools (SM) Certified.
 - 5) Lead free certified per RoHS.
 - c. Openness Factor: 3 percent in accordance with ASHRAE 74.
 - d. Thickness: 0.043 inches.
 - e. Weight: 13.69 oz./sq. yd.
 - 2. Color: As selected by Architect from manufacturer's full range.

- E. Room Darkening Fabrics (Draper) (Shade 2)
 - 1. Basis-of-Design: SheerWeave® Series SW7000, as manufactured by Phifer.
 - a. Fabric Content and Structure: 100 percent polyester with acrylic foam backing. PVC free.
 - b. Performance Characteristics:
 - 1) Flame retardant per NFPA 701 (TM#1, small scale), California U.S. Title 19 (small scale), and BS 5867-2 (Type B).
 - 2) Bacteria and Fungi Resistant per ASTM G21.
 - 3) GREENGUARD Indoor Air Quality Certified®.
 - 4) GREENGUARD Children & Schools (SM) Certified.
 - 5) Lead free certified per RoHS.
 - c. Openness Factor: 0 percent in accordance with ASHRAE 74.
 - d. Thickness: 0.026 inches.
 - e. Weight: 12.00 oz./sq. yd.
 - 2. Color: As selected by Architect from manufacturer's full range.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch.

- Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
- 2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 - 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
- B. Roller Shade Locations: Light filtering at exterior windows, unless noted otherwise. Provide room darkening shades in Training and Sleeping rooms.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

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- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 SCHEDULE

- A. Shade 1: All windows unless noted otherwise.
- B. Shade 2: Bedrooms and Training Room.

END OF SECTION 122413

SECTION 123233 - MANUFACTURED PLASTIC LAMINATE CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes wood casework for Kitchen and Shower.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For cabinets and countertops. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, hardware, edge and backsplash profiles, cutouts for plumbing fixtures, and methods of joining countertops.
- C. Samples for Selection: Manufacturer's color charts showing the full range of colors, textures, and patterns available for each type of material indicated.
 - 1. Plastic laminate for cabinets, 8 by 10 inches.
 - 2. One unit of each type of exposed hardware.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing metal cabinets similar to those indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Cabinets: Obtain casework, including tops and accessories, through one source from a single manufacturer.

1.4 COORDINATION

- A. Coordinate layout and installation of blocking and reinforcement in partitions for support of laboratory casework.
- B. Obtain templates for sink cutouts with plumbing contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver casework until painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas.
- B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install casework until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.
- C. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes if necessary.

1.7 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of table systems that fail in materials or workmanship within specified warranty period.
 - 1. One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. New England Laboratory Casework Co., Inc. 781-224-3420.
- B. Products: Subject to compliance with requirements, provide the following products:
 - 1. Arlington Series, with upgrade to HPL panels.

2.2 CABINET MATERIALS

- A. Exterior Exposed Surfaces: As follows:
 - 1. High-pressure decorative laminate.
- B. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3, Grade VGS. Color from matte wood grain options.

2.3 CABINET CONSTRUCTION

- A. Face Style: Flush overlay; door and drawer faces cover cabinet body members or face frames with only enough space between faces for operating clearance.
- B. Face Frames: Frameless.
- C. Base Units
 - 1. Cabinet Ends: 3/4" HPL particleboard with .018" mm thick PVC edge. Provide a 3/4" x 3" waterproof plywood base, tongue and grooved to bottom edge for protection against dampness.
 - 2. Front top rail: 3/4" x 5" HPL particleboard with .018" thick PVC edge, fastened to cabinet ends with locking double mechanical fasteners.
 - 3. Rear Top and Bottom Support Rails: 3/4" x 5" HPL particleboard, fastened to cabinet with a locking double mechanical fastener at each end.
 - 4. Toe Space Rail: 3/4" x 4" HPL particleboard fastened to cabinet ends with staples to form a 4" high x 2" deep toe space.
 - 5. Cabinet Bottoms: 3/4" HPL particleboard with .018" thick PVC edge, set flush and fastened to cabinet ends with three locking mechanical fasteners on each end.
 - 6. Cabinet Backs: Removable one piece 1/2" HPL particleboard on all cupboard units. Backs to match cabinet color. Backs are not provided on drawer units.
 - 7. Vertical Dividers: Provide full height dividers and half height dividers of 1 1/2" HPL particleboard secured to bottom, front top rail and rear top rail with dowels and screws. Exposed edges to be edgebanded with .018" PVC
 - 8. Shelves: 3/4" HPL particleboard with .018" thick PVC edge on front, on metal pin type shelf supports at 1-1/4" spacing. Provide 3/4 depth shelves in standard cupboards and full depth shelves in open units. Construct shelves over 36" from 1 1/4" HPL particleboard.
 - 9. Drawer Construction: Blum Metabox system with 1/2" HPL bottom and back. Exposed top edge of back to be edged with .018" thick PVC. Box drawer constructed with back, front and sides of 1/2" HPL, banded on top edge. Drawer joining: tongue and groove, glued and stapled. Drawer slide: Blum #230M series.
 - 10. Door and Drawer Fronts: 3/4" HPL particleboard banded on all sides with 3mm thick PVC edge in one of the standard colors. Provide full overlay construction.
 - 11. Horizontal Intermediate Rails: (Front and rear) 3/4" x 5" HPL particleboard, exposed edge .018" thick PVC, fastened with a locking double mechanical fasteners.
- D. Wall and Floor Cases:
 - 1. Case Ends: 3/4" HPL particleboard with .018" thick PVC edge on exposed edges. Provide floor cases with a 3/4" x 3" waterproof plywood base, tongue and grooved to bottom edge of end for protection against dampness.
 - 2. Tops of Wall and Floor Cases: 3/4" HPL particleboard with .018" thick PVC edge on exposed edge, fastened to ends with two single locking mechanical fasteners on each end.
 - 3. Bottoms of Wall Cases: 1 1/4" thick HPL particleboard with .018" thick PVC edge on exposed edge, set flush and fastened to cabinet ends with two locking mechanical fasteners.
 - 4. Bottoms of Floor Cases: 3/4" HPL particleboard with .018" PVC edgebanding, fastened to cabinet with two locking mechanical fasteners at each end.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

5. Backs: 1/2" HPL particleboard to match cabinet color. Staple and glue backs into rabbets on back edge of ends.
6. Fixed Center Shelf on Floor Cases: 1 1/4" HPL particleboard on all open, hinged and sliding door cabinets. Fasten fixed center shelves to ends with locking mechanical fasteners.
7. Adjustable Shelves: 3/4" HPL particleboard with .018" thick PVC edge on exposed front edge. Set on metal pin type shelf supports at 1 1/4" spacing.
8. Tall Case Doors: For additional strength and ease of operation, all doors for tall cabinets shall be split doors, each being half height.

E. Doors:

1. Solid Doors:

- a. Full overlay construction: 3/4" HPL particleboard, banded on all edges with 3mm thick PVC edge in one of the standard colors.
- b. Provide two hinges on all doors up to 36" in height and a minimum of three hinges on any doors exceeding this height.

2.4 HARDWARE

A. Wire Pulls: Provide powder-coated steel wire pulls. Mount drawer pulls horizontally. Mount door pulls vertically.

B. Hinges:

1. Institutional type 2-1/2", 5-knuckle powder coated steel hinge wrap around design.
2. Provide stainless steel finish.
3. Provide two hinges on doors up to 36" in height, three hinges on doors over 36" in height.

C. Drawer Slides:

1. 100 LB rated, epoxy coated, self closing slides, No. 230M Series by Blum.

D. Elbow catches: Spring type with strike, where locks occur in hinged double door units.

E. Steel Shelf Pins: Provide KV #346.

F. Levelers: Provide Hafele #637.30.941 with protective cap #637.02.090.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcement, and other conditions affecting performance of wood laboratory casework installation.

1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install plumb, level, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler panels for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Set cabinets straight, plumb, and level. Adjust subtops within 1/16 inch (1.5 mm) of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches (600 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm).
 1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches (600 mm) o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than 2 fasteners.
- C. Wall Cabinets: Hang cabinets straight, plumb, and level. Adjust fronts and bottoms within 1/16 inch (1.5 mm) of a single plane. Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches (600 mm) o.c. Align similar adjoining doors to a tolerance of 1/16 inch (1.5 mm).
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises, unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- E. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 ADJUSTING AND CLEANING

- A. Adjust casework and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- B. Clean casework on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Protection: Provide 6-mil (0.15-mm) plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at minimum of 48 inches (1200 mm) o.c.

END OF SECTION 123233

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Plastic-laminate-clad countertops and aprons.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For plastic-laminate-clad countertops.

1. Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.
2. Show locations and sizes of cutouts and holes for items installed in plastic-laminate-clad countertops.

C. Samples for Initial Selection: For plastic laminates.

D. Samples for Verification: As follows:

1. Plastic Laminates: For each type, color, pattern, and surface finish required, 8 by 10 inches in size.
2. Wood-Grain Plastic Laminates: For each type, color, pattern, and surface finish required, 12 by 24 inches in size.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For the following:

1. Composite wood and agrifiber products.
2. High-pressure decorative laminate.
3. Chemical-resistant, high-pressure decorative laminate.
4. Adhesives.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 POST-FORMED COUNTERTOPS

- A. Post-formed Countertops: HGP, nominal thickness .038" (1.0 mm), phenolic resin particleboard with .020" phenolic backer sheet. Provide contemporary design with 3/8 inch radius edges and 3/16 inch radius coves.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:
 - a. Formica Corporation.
 - b. Lamin-Art, Inc.
 - c. Nevamar Company, LLC; Decorative Products Div.
 - d. Panolam Industries International Incorporated. (Pionite)
 - e. Westinghouse Electric Corp.; Specialty Products Div.
 - f. Wilsonart International; Div. of Premark International, Inc.
- B. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by manufacturer's designations.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

2. Match Architect's sample.
3. Colors and Patterns: As selected by Architect from manufacturer's full range of options.
 - a. Tops will be solid or pattern.
 - b. Aprons will be wood grain.
- C. Core Material at Sinks: Particleboard made with exterior glue.
- D. Core Thickness: 3/4 inch.
 1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.
- E. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

2.2 WOOD MATERIALS

- A. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
 1. Particleboard: ANSI A208.1, Grade M-2.

2.3 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Contact cement.
 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.4 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
 1. Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 1. Notify Architect seven days in advance of the dates and times countertop fabrication will be complete.
 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended, and check measurements of assemblies against field measurements before disassembling for shipment.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of cutouts by saturating with varnish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
 - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 - 1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a 1/8-inch-in-96-inches variation from a straight, level plane.
 - 2. Secure backsplashes to walls with adhesive.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

3. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

F. Apron Installation: Anchor securely by screwing through support blocks.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION 123623.13

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.

B. Related Requirements:

1. Section 123661.13 "Plastic Laminate Countertops" for plastic laminate countertops.
2. Refer to Plumbing drawing M101 for Swanstone products.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:

1. Countertop material, 6 inches square.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.7 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. E. I. du Pont de Nemours and Company.
 - b. Swan Corporation (The).
 - 2. Type: Provide Standard type unless Special Purpose type is indicated.
 - 3. Integral Sink Bowls for Swanstone: Comply with CSA B45.5/IAPMO Z124.
 - 4. Colors and Patterns:
 - a. SSURFACE1: Corian, color Canvas.
 - b. SSURFACE2: Vanity top, shower wall and base, refer to the Plumbing Schedule on drawing M101. Color White 010.
- B. Particleboard: ANSI A208.1, Grade M-2.

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Premium.
- B. Configuration:

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1. Front: Straight, slightly eased at top.
 2. Backsplash: Straight, slightly eased at corner.
 3. End Splash: Matching backsplash.
- C. Countertops: 1/2-inch-thick, solid surface material laminated to 3/4-inch-thick particleboard with.
- D. Backsplashes: 1/2-inch- thick, solid surface material.
- E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
1. Fabricate with loose backsplashes for field assembly.
 2. Install integral sink bowls in countertops in the shop.
- F. Joints: Fabricate countertops without joints to greatest extent possible.
- G. Cutouts and Holes:
1. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 2. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

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- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- E. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- G. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

SECTION 142400 - HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hydraulic passenger elevators.

B. Related Requirements:

1. Section 011000 "Summary" for purchase contract for elevators negotiated by Owner and assigned to Contractor.
2. Section 015000 "Temporary Facilities and Controls" for temporary use of elevators for construction purposes.
3. Section 033000 "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
4. Section 055000 "Metal Fabrications" for the following:
 - a. Attachment plates and angle brackets for supporting guide-rail brackets.
 - b. Hoist beams.
 - c. Structural-steel shapes for subsills.
 - d. Pit ladders.

1.2 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures; hoistway entrances; and operation, control, and signal systems.

B. Shop Drawings:

1. Include plans, elevations, sections, and large-scale details indicating service at each landing; machine room layout; coordination with building structure; relationships with other construction; and locations of equipment.
2. Include large-scale layout of car-control station.
3. Indicate maximum dynamic and static loads imposed on building structure at points of support as well as maximum and average power demands.

- C. Samples for Initial Selection: For finishes involving color selection.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes, 3-inch-square Samples of sheet materials and 4-inch lengths of running trim members.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Manufacturer Certificates: Signed by elevator manufacturer, certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
- D. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
 - 1. Submit manufacturer's/installer's standard operation and maintenance manual, in accordance with ASME A17.1/CSA B44 including diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard one-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.
- B. The elevator installation shall be a design that can be maintainable by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment manufacturer.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.8 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate locations and dimensions of other work specified in other Sections that relates to hydraulic elevators, including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.9 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
 - 2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - 1. Canton Elevator (Pine State); Holeless: Dual Single Stage.
 - 2. Schindler Group; Model 330A.
 - 3. ThyssenKrupp Elevator; Endura.
- B. Source Limitations: Obtain elevators from single manufacturer.
 - 1. Major elevator components, including pump-and-tank units, plunger-cylinder assemblies, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with Section 407 in the United States Access Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.
- C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator seismic requirements in ASME A17.1/CSA B44.
 - 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
 - 2. Project Seismic Design Category: C.
 - 3. Elevator Component Importance Factor: 1.5.
 - 4. Design earthquake spectral response acceleration short period (Sds) for Project is 0.188.
 - 5. Provide earthquake equipment required by ASME A17.1/CSA B44.
 - 6. Provide seismic switch required by ASCE/SEI 7.

2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components shall be used, as included in standard elevator systems and as required for complete system.
- B. Elevator Description:
 - 1. Type: Holeless, beside-the-car, single-acting, dual cylinder.
 - 2. Rated Load: 2100 lb.
 - 3. Rated Speed: 100 fpm.
 - 4. Operation System: Single automatic operation.
 - 5. Auxiliary Operations:
 - a. Battery-powered lowering.
 - 6. Car Enclosures:
 - a. Front Walls (Return Panels): Satin stainless steel, ASTM A480/A480M, No. 4 finish with integral car door frames.
 - b. Car Fixtures: Satin stainless steel, ASTM A480/A480M, No. 4 finish.
 - c. Side and Rear Wall Panels: Plastic laminate.
 - d. Reveals: Enameled or powder-coated steel.
 - e. Door Faces (Interior): Satin stainless steel, ASTM A480/A480M, No. 4 finish.
 - f. Door Sills: Aluminum.
 - g. Ceiling: Luminous ceiling.
 - h. Handrails: 1/2 by 2 inches rectangular satin stainless steel, at sides and rear of car.
 - i. Floor prepared to receive resilient tile flooring (specified in Section 096519 "Resilient Tile Flooring").

7. Hoistway Entrances:
 - a. Width: 36 inches.
 - b. Height: 84 inches.
 - c. Type: Single-speed side sliding.
 - d. Frames: Satin stainless steel, ASTM A480/A480M, No. 4 finish.
 - e. Doors: Satin stainless steel, ASTM A480/A480M, No. 4 finish.
 - f. Sills: Aluminum.
8. Hall Fixtures: Satin stainless steel, ASTM A480/A480M, No. 4 finish Recessed type with no exposed-metal surfaces.
9. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, ASTM A480/A480M, No. 4 finish.
 - b. Provide hooks for protective pads and one complete set of full-height protective pads.

2.4 SYSTEMS AND COMPONENTS

- A. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.
 1. Pump shall be submersible type with submersible squirrel-cage induction motor, and shall be suspended inside oil tank from vibration isolation mounts or shall be tank-top-mounted type with fan-cooled, squirrel-cage induction motor, and shall be mounted on oil tank with vibration isolation mounts and enclosed in prime-painted steel enclosure lined with 1-inch-thick, glass-fiber insulation board.
 2. Motor shall have wye-delta or solid-state starting.
 3. Motor shall have variable-voltage, variable-frequency control.
- B. Hydraulic Silencers: System shall have hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.
- C. Piping: Size, type, and weight of piping as recommended by elevator manufacturer, with flexible connectors to minimize sound and vibration transmissions from power unit.
 1. Cylinder units shall be connected with dielectric couplings.
 2. Casing for Underground Piping: Schedule 40 PVC pipe complying with ASTM D1785, joined with PVC fittings complying with ASTM D2466 and solvent cement complying with ASTM D2564.
- D. Hydraulic Fluid: Elevator manufacturer's standard fluid with additives as needed to prevent oxidation of fluid, corrosion of cylinder and other components, and other adverse effects.
- E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Device installation is specified in another Section.

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- F. Protective Cylinder Casing: PVC or HDPE pipe casing complying with ASME A17.1/CSA B44, of sufficient size to provide not less than 1-inch clearance from cylinder and extending above pit floor. Casing shall have means of monitoring effectiveness to comply with ASME A17.1/CSA B44.
- G. Car Frame and Platform: Welded or bolted steel units.
- H. Guides: Roller guides or sliding guides with guide-rail lubricators. Provide guides at top and bottom of car frame.

2.5 OPERATION SYSTEMS

- A. Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
- B. Auxiliary Operations:
 - 1. Single-Car Battery-Powered Lowering:
 - a. If power fails and car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it is lowered to a preselected floor, opens its doors, and shuts down. If car is below the preselected floor, it is lowered to the next lower floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
 - b. When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.

2.6 DOOR-REOPENING DEVICES

- A. Infrared Array: Provide door-reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door-reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.7 CAR ENCLOSURES

- A. Provide steel-framed car enclosures with nonremovable wall panels, with car roof, access doors, power door operators, and ventilation.
 - 1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
 - 1. Subfloor:

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- a. Exterior, underlayment-grade plywood, not less than 5/8-inch nominal thickness.
 - b. Exterior, C-C Plugged grade plywood, not less than 7/8-inch nominal thickness.
2. Floor Finish:
- a. Specified in 096519 "Resilient tile flooring." Provide RFT1 flooring
3. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to 1/2-inch fire-retardant-treated particleboard with manufacturer's standard protective edge trim. Panels have a flame-spread index of 25 or less, when tested according to ASTM E84. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
4. Fabricate car with recesses and cutouts for signal equipment.
5. Fabricate car door frame integrally with front wall of car.
6. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet.
7. Sight Guards: Provide sight guards on car doors.
8. Sills: Extruded or machined metal, with grooved surface, 1/4 inch thick.
9. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic.
10. Light Fixture Efficiency: Not less than 35 lumens/W.
11. Ventilation Fan Efficiency: Not less than 3.0 cfm/W.

2.8 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.
- B. Fire-Rated Hoistway Entrance Assemblies: Door-and-frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252 or UL 10B.
1. Fire-Protection Rating: 1-1/2 hours.
- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
1. Steel Subframes: Formed from cold- or hot-rolled steel sheet, with factory-applied enamel or powder-coat finish or rust-resistant primer. Fabricate to receive applied finish as indicated.
 2. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet.
 3. Sight Guards: Provide sight guards on doors matching door edges.
 4. Sills: Extruded or machined metal, with grooved surface, 1/4 inch thick.
 5. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

2.9 SIGNAL EQUIPMENT

- A. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide buttons and lighted elements illuminated with LEDs.
- B. Car-Control Stations: Provide manufacturer's standard recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
 - 1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.
 - 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- C. Swing-Return Car-Control Stations: Provide car-control stations mounted on rear of hinged return panel adjacent to car door and with buttons, switches, controls, and indicator lights projecting through return panel but substantially flush with face of return panel.
 - 1. Mark buttons and switches for function. Use both tactile symbols and Braille.
 - 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- D. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- E. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet in each car and required conductors in traveling cable for firefighters' two-way telephone communication service specified in Section 263100 "Fire-Alarm Systems."
- F. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- G. Hall Push-Button Stations: Provide one hall push-button station at each landing.
 - 1. Provide manufacturer's standard wall-mounted units.
 - 2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.
- H. Hall Lanterns: Units with illuminated arrows; however, provide single arrow at terminal landings. Provide the following:
 - 1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
- I. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.

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1. At manufacturer's option, audible signals may be placed on cars.

- J. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.

2.10 FINISH MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel, Type B, exposed, matte finish.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, commercial steel, Type B, pickled.
- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304.
- D. Stainless Steel Bars: ASTM A276, Type 304.
- E. Aluminum Extrusions: ASTM B221, Alloy 6063.
- F. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS for flat applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor and braced at intervals as needed to maintain alignment. Anchor cylinder guides at spacing needed to maintain alignment and avoid overstressing guides.
- B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS workmanship and welding operator qualification standards.

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- C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- D. Install piping above the floor, where possible. Install underground piping in casing.
 - 1. Excavate for piping and backfill encased piping according to applicable requirements in Section 312000 "Earth Moving."
- E. Lubricate operating parts of systems as recommended by manufacturers.
- F. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- G. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.
- H. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- I. Locate hall signal equipment for elevators as follows unless otherwise indicated:
 - 1. For groups of elevators, locate hall push-button stations between two elevators at center of group or at location most convenient for approaching passengers.
 - 2. Place hall lanterns either above or beside each hoistway entrance.
 - 3. Mount hall lanterns at a minimum of 72 inches above finished floor.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 PROTECTION

- A. Temporary Use: Temporary use is not allowed.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate elevator.
- B. Check operation of elevator with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

3.6 MAINTENANCE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
1. Perform maintenance during normal working hours.
 2. Perform emergency callback service during normal working hours with response time of two hours or less.

END OF SECTION 142400

SECTION 200100 - GENERAL MECHANICAL REQUIREMENTS

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including the General and Supplementary Conditions and Divisions 00 and 01 of the Project Manual apply specifically to this Section. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 SCOPE

- A. The Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, inspections, and incidentals required to install and leave in place complete and fully operative mechanical systems.
- B. Materials entering into the work shall be new and of the quality specified, otherwise to be of the best commercial quality obtainable for the purpose. The work shall be performed in the best and most substantial manner in accordance with the standards of the trade and all applicable codes.
- C. Work and materials shall be in accordance with the Drawings and Specifications even though the specified work may exceed the minimum requirements of applicable codes, ordinances, and regulations.

1.03 GOVERNING CODES AND PERMITS REQUIRED

- A. The work shall comply with all applicable codes, ordinances, rules, regulations, and laws in effect. These include, but are not limited to, the requirements of the following organizations and codes:
 - 1. NFPA - National Fire Protection Association including:
 - (a) NFPA 90A – Standard for Installation of Air Conditioning & Ventilation Systems
 - (b) NFPA 101 – Life Safety Code
 - 2. Maine State Plumbing Code
 - 3. NEC - National Electric Code
 - 4. ADA - Americans with Disabilities Act
 - 5. MMBC – Maine Model Building Code
 - 6. Applicable State, County, and Local requirements.
- B. Contractor shall arrange and pay for all permits, tests, and inspections specified or required by above agencies and shall furnish required certificates of inspection to Owner and Engineer.
- C. The Contractor shall submit any discovered conflicts between the Contract Documents and governing codes or laws to the Architect/Engineer in writing prior to starting work. Work, completed prior to this submittal, that needs to be changed to comply with governing codes or laws, shall be made at the Contractor's expense.

1.04 DRAWINGS

- A. Should there be any work indicated on the Drawings and not specified in the Specifications, or vice-versa, the work shall be provided as if called for in both documents.
- B. The Drawings indicate the general location of equipment, fixtures, piping, and ductwork. Exact locations shall be determined in the field and minor adjustments shall be made as work progresses. However, this shall not be construed to mean the design of systems can be arbitrarily changed. All changes shall be subject to Owner and Architect/Engineer acceptance.
- C. The Drawings do not indicate all required offsets, fittings, traps, hangers, accessories, specialties, etc. The Contractor shall investigate the structural and finish conditions affecting the work and provide these items as necessary.
- D. Questions regarding the interpretation or extent of the Drawings or Specifications shall be referred to the Architect/Engineer in writing prior to the start of work. Failure to do this shall not relieve the Contractor of responsibility to provide materials and work in accordance with the intent of the Drawings and Specifications.

1.05 DEFINITIONS

- A. The word “provide” shall mean, “furnish and install” including connections to services if required, unless specified otherwise.
- B. The word “Contractor” shall mean, “Contractor or Sub-Contractor for the work described”.
- C. The word “indicated” shall mean, “indicated on the Contract Drawings”.
- D. The words “equal” or “approved equal” shall mean “an item determined by the Engineer to be equivalent of the item specified.”

1.06 COORDINATION

- A. The Contractor shall study the entire set of Contract Documents to determine if the work conflicts with existing facilities, structure, or the work of other trades. Conflicts shall be submitted to the Architect/Engineer before starting work.
- B. Drawings of existing facilities or site work shall not be scaled to determine required dimensions. These dimensions shall be determined by field measurements.
- C. The Contractor shall visit the site during construction and shall take such measurements as necessary to determine that actual conditions follow the Contract Documents so that the mechanical work may be properly installed without interferences or delays.
- D. The Contractor shall coordinate the work with other trades sufficiently in advance that the work of other trades can be planned and installed without additional cost or delay.
- E. The Submission of a bid indicates the Contractor has examined the site and contract documents and has included appropriate allowances in the bid. No compensation shall be made for errors resulting from the Contractor’s failure to visit the job site, review the drawings, or coordinate the work with other trades.

1.07 SUBMITTALS

- A. The Contractor shall submit shop drawings and/or manufacturer product literature as called for or needed for a thorough understanding of the work.
 - 1. Items shall be grouped to provide complete submittals for related systems, products, and accessories.
 - 2. Submittal data shall be identified by project name and equipment identification number.
 - 3. Proposed options, finishes, sizes, and/or models shall be clearly indicated.
 - 4. The Contractor shall note any minor or incidental deviations from the specified item on the submittal. If the deviations cannot be classified as “minor or incidental”, then a request for substitution shall be made in accordance with the “Substitutions” paragraph of this Section.
- B. Submittal of material or equipment to the Architect/Engineer for review indicates the Contractor has confirmed that the item meets the capacity, efficiency, design, and quality specified and can be properly installed in the location indicated without interferences.
- C. Review by the Architect/Engineer pertains only to the item’s general compliance with the Contract Documents. Quantities, dimensional requirements, and details remain the responsibility of the Contractor.

1.08 SUBSTITUTIONS

- A. Where makes and models are specified, the words “or approved equal” may be inferred unless the item is notated with the word, “ONLY”. If notated “ONLY”, that particular make and model shall be provided.
- B. Requests for Substitutions may be made within 20 days following the award of the contract. The requests shall be accompanied by:
 - 1. Documentation of the product’s adequacy.
 - 2. Detailed descriptions of differences between the specified product and the proposed product.
 - 3. Certified price and delivery quotations from suppliers of both the specified and proposed items. (If requested by the Engineer)
 - 4. Itemized account of the cost differences between the specified and the proposed items including installation costs or savings. (If requested by the Engineer)
- C. Cost reductions resulting from substitutions shall benefit the Owner through a contract change order credit.
- D. Substitutions must have received acceptance from the Engineer in the form of an approved submittal prior to being ordered.
- E. The Contractor shall assume the costs and entire responsibility for any changes resulting from the acceptance of materials and/or equipment other than specified.

1.09 CLOSEOUT SUBMITTALS

A. Record Drawings:

1. The Contractor shall maintain at least two separate sets of Drawings for the purpose of recording “as-built” information. As the work progresses, all changes from the original layouts shall be neatly and accurately recorded. Different colors shall be used in marking various services.
2. The Architect/Engineer may refuse to review Payment Applications until satisfied the Record Drawings are accurate and current. If the record drawings are found to be inaccurate or incomplete, the Contractor shall correct them promptly.

B. Operation and Maintenance Data:

1. Organize data into three-ring binders with identification on front and spine of each binder and pocket folders for folded sheet information. Include the following:
 - (a) Manufacturer’s operation and maintenance brochures
 - (b) Emergency instructions
 - (c) Spare parts list
 - (d) Wiring diagrams
 - (e) Copies of warranties

C. Record Drawings and Operation and Maintenance Data shall be turned over to the Architect/Engineer upon completion of the work. Final payment will not be due until the Record Drawings have been received and accepted.

1.10 OWNER TRAINING

- A. Provide training for the building operators on all equipment and systems that require the owner’s adjustment, operation, surveillance, or maintenance. This training shall be "hands-on" type at the project site. A mutual agreement on the scheduling of this training will be made between the owner and the contractor.

1.11 WARRANTY

- A. Requirements of these paragraphs are in addition to any requirements of the general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections.
- B. Upon completion of the Work and as a condition of its acceptance, deliver to the Architect/Engineer two copies of a written Warranty agreeing to replace work executed under this Section that fails due to defective materials or workmanship. Include copies of the Warranty in the Operation and Maintenance Manuals.
- C. Failure due to defective materials or workmanship is deemed to include, but not be limited to:
 1. Failures in operating component or components.
 2. Leakage from piping system.
 3. Violations of applicable codes, laws, or ordinances.
- D. The Contractor shall not be responsible for defects that are clearly the result of bad usage of the equipment by persons not under the Contractor’s control.

- E. Warranty shall include 24-hour service of complete system during warranty period at no cost to Owner. The choice of the service organization shall be subject to Owner's approval.
- F. Warranty period shall begin only after installation of all mechanical systems are complete, all work required from final punchlist inspections are complete and accepted by the Owner. In addition, all information related to the project shall have been received and accepted by the Architect/Engineer including operating and maintenance manuals, inspection results, and test results specified herein.
- G. Obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation. At the end of the warranty period, transfer manufacturer's equipment and material warranties still in force to Owner.
- H. This Article shall not be interpreted to limit Owner's rights under applicable codes and laws and under this Contract.

PART 2 – PRODUCTS

2.01 MACHINERY AND PIPING VIBRATION ISOLATORS

- A. General: Isolate equipment, piping, and ductwork to prevent noise or vibration from being transmitted to the building structure. Should any objectionable noise or vibration be transmitted to any occupied part of the building by apparatus, piping, or ducts, as determined by the Engineer, the Contractor shall make the necessary changes to eliminate the noise or vibration at no extra cost to the Owner.

2.02 PIPE HANGERS

- A. Pipe Hangers: Hangers shall be designed and manufactured in conformance with MSS SP-58 and sized to accommodate the insulation thickness.
 - 1. Pipe sizes 1/2" to 1-1/2": Adjustable wrought steel ring hangers.
 - 2. Pipe sizes 2" to 4": Adjustable wrought steel clevis hangers.
 - 3. Copper Tubing 3" and smaller: Band or clevis hangers designed to prevent the contact of dissimilar metals.
- B. Vertical Support: Steel riser clamp sized to fit outside diameter of pipe.
- C. Accessories: Insulated pipes 2-1/2" size and larger shall have insulation protection saddles. Insulated pipes 2" and smaller shall have insulation shields.
 - 1. Insulation Shields: Minimum 18 gauge galvanized sheet metal, 12" minimum length, 180° coverage designed to match the outside diameter of the pipe insulation.

2.03 ACCESS PANELS

- A. Provide access panels of required size for walls and ceilings where required for access to concealed valves, radiant heat manifolds, fire dampers, damper operators, and controls. Coordinate exact location of the access panels with the Architect/Engineer. Milcor Style DW for non-rated drywall ceilings or walls, Style M for masonry walls, and Style UFR for rated walls and ceilings.

1. Access panels shall be suitable for flush mounting with smooth covers primed for painting except provide baked enamel finish in tiled walls. The color to be selected by the Architect/Engineer.
2. Panels shall be minimum 12” x 12” except where space limitations dictate a smaller size or otherwise indicated. Panels shall be large enough to comfortably access and maintain equipment.
3. Panels shall have fire rating equal to the wall, ceiling or partition in which they are installed.

2.04 THROUGH PENETRATION FIRESTOP SYSTEMS

- A. Penetrations through fire-rated construction shall comply with a listed fire-rated assembly as detailed in the *UL Fire Resistance Directory*. The assembly shall have the same fire-rating, in hours, as the wall or floor penetrated.
 1. The system components including wraps, sheets, caulks, and/or sealants shall be of the same quality as those manufactured by 3M Fire Protection Products.
- B. Where PVC pipes pass through fire rated construction, provide metal collar assembly with expanding firestop material. Device shall be UL listed for installations in fire rated assemblies. 3M Fire Protection Products PPD Ultra.
- C. Submit each proposed UL system number with ratings, details and descriptions. Submit manufacturer’s product literature for each system component.

PART 3 – EXECUTION

3.01 PROTECTION

- A. The Contractor shall protect materials and shall prevent injury, discoloration, or defacement of finished building surfaces. The Contractor shall do no cutting or fitting of the materials of others. The Contractor shall exercise proper supervision to prevent damage due to flood, fire, smoke, dust, etc. Any such damage shall be repaired or replaced to the full satisfaction of the Owner at no additional cost or increase in Contract time.
- B. No piping or equipment shall be installed outside of a building, in an exterior wall, or unheated space unless adequate provision is made to protect such piping or equipment from freezing.

3.02 PIPING INSTALLATION

- A. Piping Layout
 1. Locate piping, valves, and fittings to allow maintenance and equipment removal including the removal of tubes and coils.
 2. Run piping parallel with or at right angles to walls, except as otherwise indicated.
 3. Pitch piping uniformly to drain.
 4. Conceal piping in finished areas in walls, ceilings, floors, chases, etc.
 5. Run exposed piping as close as possible to walls and ceilings.

6. The size and general arrangement of piping, as well as the method of connecting piping, valves, equipment, etc. shall be as indicated, or as approved by the Engineer.
7. Install air vents at all high points in closed liquid piping systems.
8. Provide 1/2" size ball valves for drains at all low points in liquid piping systems, provide with hose connections.

B. Workmanship

1. Complete installation to present a neat and orderly appearance.
2. Keep inside of pipes and fittings free from dirt and debris.
3. Exposed piping shall show no tool marks.
4. After cutting, ream pipes out to full bore.
5. Cut pipe accurately and install without springing or forcing.

C. Fittings

1. Install unions adjacent to equipment. Use flanged joints in lieu of unions for pipe sizes 2-1/2" and larger.
2. Do not install joints or fittings over any motor, switchboard, or other electrical equipment.
3. Provide swing joints at mains and connections to risers. Provide swing joints, expansion loops and fittings as required to achieve flexible piping systems.
4. Where changes in pipe sizes occur, use reducing fittings. Box unions and reducing bushings are not acceptable. Where reducers are required, use eccentric reducers in horizontal piping and concentric reducers in vertical piping.
5. Install valves in accessible locations with stems above the horizontal position. Install ball valves so they are capable of being fully opened or closed without interference. Provide stem extensions as required to avoid interference with pipe insulation.
6. Install isolation valves at all branch connections (branch connections are defined as any piping connection to the main riser or another branch connection).
7. Install flexible connectors at all equipment mounted with vibration isolators.

3.03 PIPE HANGERS AND SUPPORTS

- A. Support piping with hangers specified. Rods shall be double-nutted.
- B. The Contractor shall coordinate installation of piping and hangers with other trades to assure required access to structural members.
- C. Do not support piping from other piping.
- D. Support vertical risers with finished steel clamp rings at approximately 8' above floor at each level.

- E. Use multiple or trapeze hangers where several pipes are installed parallel to one another.
- F. Attach supports to building structure with beam clamps. Where structure is not immediately above pipe being supported, extend structure with beams, channels, or steel angle as required to provide proper support.
- G. Hanger spacing and rod diameter shall be in accordance with the following table and notes:

Pipe Size (Inches)	Maximum Spacing (Feet)	Rod Diameter (Inches)
1/2	6	3/8
3/4	6	3/8
1	8	3/8
1-1/4	8	3/8
1-1/2	8	3/8
2	10	3/8

- 1. Maximum spacing for copper pipe shall be 5' – 0"
- 2. Support PVC piping in accordance with manufacturer's written recommendations and so there are no sags in the piping.

3.04 SLEEVES AND PENETRATIONS

- A. Piping penetrations through fire rated construction shall comply with a listed fire-rated assembly as detailed in the *UL Fire Resistance Directory*. Install through penetration firestop systems to comply with manufacturer's drawings, installation instructions, and UL listing.
- B. Pipe sleeves through floors, exterior walls, and fire-rated construction shall be Schedule 40 galvanized steel pipe. Pipe sleeves through non-fire-rated partitions shall be 26 gauge, galvanized steel.
 - 1. When piping is not insulated, the sleeve shall be two sizes larger than the penetrating pipe.
 - 2. When piping is insulated, the sleeve shall be sized allow approximately 1/2" of annular space all around.
- C. Provide adjustable escutcheons on exposed piping that passes through finished floor, walls, and ceilings. Escutcheons shall be chromium-plated cast brass, sized to cover sleeve opening and to accommodate pipe and insulation.
- D. Duct sleeves through fire rated construction shall be in accordance with SMACNA Fire, Smoke, and Radiation Installation Guide for HVAC systems. Duct sleeves through non-fire-rated partitions shall be 26-gauge galvanized steel. Duct sleeves through non-fire-rated floors and exterior walls shall be 16-gauge galvanized steel.
- E. Packing for sleeves that do not require maintenance of fire-ratings shall be silicate foam, ceramic fiber, or mineral fiber with approved sealant. Pack or foam to within one inch of both wall surfaces. Seal penetration packing with approved caulking and paintable waterproof mastic surface or silicone caulking.

3.05 DEMOLITION

- A. Remove existing piping, ducts, fixtures, equipment, accessories, etc. as required to complete the work. Removed unused materials from the site and dispose of in accordance with local law.

3.06 CUTTING AND PATCHING

- A. Mechanical Contractor shall install hangers, supports, and sleeves in floors, walls, partitions, ceilings and roofs as construction progresses.
- B. Cutting of materials for the passage of piping and ductwork through floors, walls, ceilings, partitions, and roofs shall be done by the Contractor.
 - 1. Contractor shall close all such openings around piping with materials equivalent to that removed.
 - 2. Exposed surfaces shall be finished to match existing adjacent surfaces.
- C. No structural member shall be cut without prior written acceptance of the Architect/Engineer.

3.07 START-UP

- A. Start-up of equipment and systems shall be in accordance with manufacturer's written documentation. Where specified, the Contractor shall arrange for the manufacturer's start-up service, field-testing, and instruction of the Owner's operating personnel.

3.08 FINAL ACCEPTANCE

- A. Before final acceptance of the work under this section, the Contractor shall clean and polish fixtures, flush piping systems, remove debris, scaffolding, and tools from the worksite. The premises shall be "broom clean" to the satisfaction of the Engineer.

PIPE SPECIFICATION SHEET

SERVICE: Domestic Cold Water, Hot Water, Recirculated Hot Water (CW, HW, RHW)

PIPE SIZE: 2” and smaller

Pipe: Seamless copper, Type L, hard drawn, ASTM B-88 (above ground) or Type K soft copper (underground) or PEX Tubing.

Note: Type M Copper shall not be allowed for Plumbing Lines.

PEX Tubing: Tube shall be cross-linked polyethylene (PEX) manufactured by PEX-a method, PEX tubing shall be manufactured in accordance with ASTM F876, ASTM F877. The tube shall be listed to ASTM by an independent third party agency. PEX tubing shall be listed to both NSF/ANSI 14 and 61. Tubing shall be color coded: Red for HW/RHW, Blue for CW.

Fittings: Sweat Type: Cast bronze or wrought copper, solder-type fittings; ANSI B16.22. Separate copper and steel pipe with screwed di-electric fittings or brass valves. Joint material shall be SilverBrite 100 solder with flux as recommended by manufacturer. **Do not use 95/5 solder.**

Threaded Type: Cast bronze, 125 lb W.S.P, 200 lb. Non shock W.O.G.

PEX Fittings: PEX-a cold expansion type fittings shall be an assembly consisting of insert and PEX-a cold expansion ring. Fitting connections shall be made to the requirements of ASTM F1960 and supplied by the PEX tubing manufacturer.

Flanges: Bronze, 150 lb.

Valves: Ball Valve: Bronze, Full Port, 400 WOG, Federal Specification WW-V-35C, Type II, Threaded or Solder joint. Provide extended stem as required to clear insulation.

Globe Valve: Bronze, 300 CWP, Federal Specification WW-V-51f, Class A, Type I and MSS SP-85. Solder joint connections.

Swing Check Valve: Bronze, Class 125, Federal Specification WW-V-51f, Class A, Type IV and MSS SP-80. Threaded or solder joint.

PIPE SPECIFICATION SHEET

SERVICE: Waste, Vent, & Drainage (SAN, V, RL)

LOCATION: ABOVE GRADE

Pipe: Cast Iron with no-hub joints (above grade). CISPI Standard 301-72, bitumastic coated.

OR

PVC DWV or Sewer Pipe, Schedule 40, bell & spigot type.

Joints: No-hub: Neoprene gasket and stainless steel draw bands, Hubless coupling gaskets per ASTM C-564

PVC: Fittings shall be of same material as pipe. Joints shall be secured with solvent cement as recommended by the pipe manufacturer.

LOCATION: BELOW GRADE

Pipe: Cast Iron with push on joints. CISPI Standard 301-72, bitumastic coated OR PVC Sewer Pipe, Schedule 40, bell & spigot type.

Joints: Compression gaskets: rubber, ASTM C-564

PVC: Fittings shall be of same material as pipe. Joints shall be secured with solvent cement as recommended by the pipe manufacturer.

Notes:

1. Pipe and fittings shall conform to the requirements of the Maine State Plumbing Code for material and gauge.
2. PVC piping shall not be installed in plenum rated spaces.
3. Vent piping shall be cast iron through roof.

PIPE SPECIFICATION SHEET

SERVICE: Condensate Drain Piping (C)

PIPE SIZE: 2" and smaller

Pipe: DWV Copper, ASTM B306

OR

PVC Pipe, Schedule 40, bell & spigot type.

Joints: Solder ends for DWV copper; ASTM B32 solder containing no lead.

PVC: Fittings shall be of same material as pipe. Joints shall be secured with solvent cement as recommended by the pipe manufacturer

Fittings: Same material as pipe

PIPE SPECIFICATION SHEET

SERVICE: Hot Water Supply and Return (HWS, HWR)

PIPE SIZE: 2-1/2" and Under

Pipe: Seamless copper, Type L or M, hard drawn, ASTM B-88 with sweat type fittings.

OR

Schedule 40 carbon steel pipe, ASTM A53 or A120, with welded or threaded fittings.

Fittings: Sweat Type: Cast bronze or wrought copper, solder-type fittings; ANSI B16.22. Separate copper and steel pipe with screwed di-electric fittings or brass valves. Joint material shall be lead free 95/5 tin-antimony solder with flux as recommended by manufacturer.

Welded Type: ANSI B16.11 Socket Weld

Screwed Type: ANSI B16.3, 300# WOG malleable iron.

Valves: Ball Valve: Bronze, Full Port, 400 WOG, Federal Specification WW-V-35C, Type II, Threaded or Solder joint. Provide extended stem as required to clear insulation.

Gate Valve (Rising Stem): Bronze, Class 125, Solid wedge disc, Federal Specification WW-V-54d, Class A, Type II and MSS SP-80. Threaded or solder joint.

Gate Valve (Non Rising Stem): Bronze, Class 125, Solid wedge disc, Federal Specification WW-V-54d, Class A, Type I and MSS SP-80. Threaded or solder joint.

Globe Valve: Bronze, Class 125, Federal Specification WW-V-51f, Class A, Type I and MSS SP-80. Threaded connections.

Swing Check Valve: Bronze, Class 125, Federal Specification WW-V-51f, Class A, Type IV and MSS SP-80. Threaded or solder joint.

Lift Check Valve: Bronze, Class 150, Federal Specification WW-V-51f, Class B, Type III and MSS SP-80. Threaded connections.

END OF SECTION 200100

SECTION 211300 – FIRE SUPPRESSION SPRINKLER SYSTEM

(THIS SECTION IS A PERFORMANCE SPECIFICATION)

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including the General and Supplementary Conditions and Divisions 00 and 01 of the Project Manual apply specifically to this Section. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 DESCRIPTION

- A. Design, fabricate, install and secure required approvals of a complete fire protection automatic sprinkler system for uniform distribution of water by hydraulic design to afford complete fire protection coverage throughout the new addition to the building as well as a dry pipe system to afford complete fire protection coverage for any unheated areas subject to freezing.
- B. The installation shall include all materials, accessories, and equipment necessary to provide a system complete and ready for use. Design and installation shall give full consideration to blind spaces, piping, electrical equipment, ductwork, and other construction and equipment to afford complete coverage in accordance with detailed drawings to be submitted for approval.
- C. Devices and equipment for fire protection service shall be listed by the Underwriter's Laboratories, Inc. or approved by the Factory Mutual System.
- D. The design and installation shall be as needed for a complete and proper installation in accordance with pertinent requirements of the State Fire Marshall's Office.

1.03 QUALITY ASSURANCE

- A. The installer shall possess a valid State of Maine contractor's license. The installer shall have been actively and successfully engaged in the installation of commercial automatic sprinkler systems for the past ten years.
- B. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for the proper performance of the work of this Section.
- C. In addition to complying with pertinent codes and regulations of the State Fire Marshall's Office, comply with pertinent recommendations contained in the National Fire Protection Association (NFPA) Standard 13, Installation of Sprinkler Systems.

1.04 SUBMITTALS

- A. Submit as one package in accordance with Section 200100, GENERAL MECHANICAL REQUIREMENTS. Prepare detailed working drawings that are signed by a NICET Level III or Level IV Sprinkler Technician or stamped by a Licensed Professional Engineer practicing in the field of Fire Protection Engineering. Partial submittals will not be accepted. Material submittals shall be approved prior to the purchase or delivery to the job site. Suitably bind submittals in notebooks or binders and provide index referencing the appropriate specification section. Submittals shall include, but not be limited to, the following:

1. Qualifications:

- (a) Provide a copy of the installing contractor's State of Maine contractors license.
- (b) Provide a copy of the NICET certification for the NICET Level III or Level IV Sprinkler Technician who prepared and signed the detailed working drawings unless the drawings are stamped by a Licensed Professional Engineer practicing in the field of Fire Protection Engineering.

2. Drawings: Submit detailed 1/8" = 1' -0" scale (minimum) working drawings conforming to NFPA 13 and Stamped as having been approved by the State Fire Marshall's Office.

3. Manufacturers Data Sheets:

- (a) Provide for materials and equipment proposed for use on the system. Include listing information and installation instructions in data sheets. Where data sheet describes items in addition to that item being submitted, clearly identify proposed item on the sheet.

4. Final Document Submittals: Provide as-built drawings, testing and maintenance instructions in accordance with the requirements in Section 20 01 00, GENERAL FIRE SUPPRESSION, PLUMBING AND HVAC REQUIREMENTS. Submittals shall include, but not be limited to, the following:

- (a) One complete set of reproducible as-built drawings showing the installed system.
- (b) Material and Testing Certificate: Upon completion of the sprinkler system installation or any partial section of the system, including testing and flushing, provide a copy of a completed Material and Testing Certificate as indicated in NFPA 13. Certificates shall document all parts of the installation.
- (c) Instruction Manual: Provide one copy of the instruction manual covering the system in a flexible protective cover and mount in an accessible location adjacent to the riser.

1.05 WATER SUPPLY

- A. Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for bases of design in accordance with NFPA 13.

1.06 PRODUCT HANDLING

- A. Responsibility for care and protection of all materials and mechanical work rests with the Contractor at all times until the entire project has been completed, tested and the project is accepted by the Owner.

PART 2 – PRODUCTS

2.01 DESIGN

- A. Provide a design which is complete in all regards including, but not necessarily limited to:
 - 1. Connection to sprinkler system riser
 - 2. Overhead sprinkler system for the new addition (installed this Contract)
- B. Base hydraulic calculations on static pressure, flow and residual pressure to be determined by the site.
- C. Hazard classification for the new addition and existing facility shall be determined by the system designer.

2.02 MATERIALS

- A. Sprinkler heads
 - 1. Provide sprinkler heads complying with NFPA 13.
 - 2. Provide extra sprinkler heads and sprinkler head wrench in a metal cabinet adjacent to the sprinkler riser valve. The number and types of extra sprinkler heads shall be as specified in NFPA 13.
- B. Provide supports, hangers, inserts, and associated items to properly support sprinkler piping in accordance with pertinent provisions of NFPA 13.

2.03 ABOVE GROUND PIPING SYSTEMS

- A. Provide fittings for changes in direction of piping and for all connections. Make changes in piping sizes through tapered reducing pipe fittings; the use of bushings will not be permitted.
- B. Sprinkler pipe shall be steel. Fittings into which sprinkler heads, sprinkler head risers, or drop nipples are threaded shall be welded, threaded, or grooved-end type. Rubber gasketed grooved-end pipe and fittings with mechanical couplings shall be permitted in pipe sizes 1-1/4" and larger; fittings shall be UL listed and FM approved for use in sprinkler systems.
- C. Provide supports, hangers, inserts, and associated items to properly support sprinkler piping in accordance with pertinent provisions of NFPA Standard No. 13.
- D. Provide pipe sleeves where piping passes through wall, floors, roofs, and partitions. Secure sleeves in proper position and location. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, roofs, and partitions. Provide not less than 1/4" space between exterior of piping or pipe insulation and interior of sleeve. Caulk the space between sleeve and pipe or pipe covering airtight with Dow Corning Fire Stop System or equal.
 - 1. Sleeves in masonry and concrete walls, floors, and roofs shall be ASTM A53 or ASTM A120 Schedule 40 zinc-coated steel, extending 3" above finished floor slabs.
 - 2. Sleeves in partitions and other the masonry and concrete walls, floors, and roofs shall be zinc-coated steel sheet having a nominal weight of not less than 0.90 pounds per square foot.

- E. Provide one piece or split hinge type metal plated for piping passing through floors, walls, and ceilings in exposed areas. Provide chromium-plated finish on plates in finished areas. Provide paint finish on plates in unfinished areas. Securely anchor plates in place with setscrews or other approved positive means.

2.04 DRY PIPE VALVES

- A. ULC listed, Cast iron, flanged type, sized to suit water main. Provide with accelerator, air maintenance device with low pressure alarm, alarm pressure switch with supervisory capability, pressure gauges, drain valve, test valve with associated piping, shut off valve - OS & Y with tamper-proof device wired back to fire alarm panel.

2.05 COMPRESSED AIR SUPPLY

- A. Air Compressor, UL listed for service. Coordinate voltage/phase with electrical availability in building.
- B. Compressed Air Piping: Ferrous with screwed joints and fittings per NFPA 13.

2.06 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and subject to the approval of the Architect.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected. No claim will be recognized for the extra compensation due to failure of the Contractor to familiarize itself with the conditions and extent of the proposed work.

3.02 INSTALLATION

- A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the approved design drawings and the requirements of the State Fire Marshall's Office.

3.03 TESTING AND ACCEPTANCE

- A. Upon completion of the installation, provide necessary personnel and equipment and test and retest the complete system, making adjustments as required, and secure all necessary approvals.
- B. When the system has been completely approved, secure a letter of final acceptance from the State Fire Marshall's Office, and forward two copies of the letter to the Architect.

END OF SECTION 211300

SECTION 220000 - PLUMBING

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including General and Supplementary Conditions and Divisions 00 and 01 of the Project Manual apply specifically to work of this Section.
- B. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 DESCRIPTION

- A. This section of the work includes all labor, equipment, materials, transportation, permits, inspections, and incidentals required to provide a complete and functional plumbing system.
- B. This section of the work includes drainage and venting systems to 5' – 0" beyond the outside wall unless noted otherwise.
- C. Work shall be in accordance with the current edition of the Maine State Plumbing Rules and applicable local ordinances.

1.03 SUBMITTALS

- A. The Contractor shall consult Section 200100 – “Substitutions” relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 200100 apply are as follows:
 - 1. Piping Materials
 - 2. Valves
 - 3. Elevator Pit Sump Pump System
 - 4. Water Heater
 - 5. HW Recirculation Pump
 - 6. Fixtures & Trim
 - 7. Miscellaneous Equipment

PART 2 – PRODUCTS

2.01 PIPING MATERIALS

- A. Refer to Pipe Specification Sheets at the end of Section 200100 for typical plumbing system pipe & fittings.
- B. Exposed Water & Waste Piping at Fixtures: Chrome plated brass including traps, flow restrictors, supplies, stops, and union connections.

2.02 VALVES

- A. Refer to the Pipe Specification Sheets at the end of Section 200100 for typical plumbing system valves.
- B. Drain Valves: Provide ball valves with 3/4" hose connection.
- C. Balancing Valves: TACO Accu-flow, full size of the pipe unless noted otherwise.
- D. Fixture Service Stop Valves: Angle Wheel Handle Stop, ASME A112.18M
 - 1. Each plumbing fixture shall have individual stop valves in the hot and cold supplies. Service stop valves in finished areas shall be chrome-plated brass. In non-finished areas, ball valves shall be used.
- E. Temperature & Pressure Relief Valves: Bronze body, tested under ANSI Z21.22, AGA, and ASME rated. Relief settings shall be 125 psig/210 °F unless noted otherwise.
- F. Pressure Reducing Valves: Watts regulator series 5 ULP bronze body, bronze internals, 200 psi working pressure, 200 °F maximum temperature.

2.03 ELEVATOR PIT SUMP PUMP SYSTEM

- A. Provide as indicated and scheduled on the Drawings.

2.04 WATER HEATER

- A. Provide as indicated and scheduled on the Drawings.

2.05 RECIRCULATION PUMP

- A. Provide as indicated and scheduled on the Drawings.

2.06 FIXTURES AND TRIM

- A. Fixtures: Refer to the Fixture Schedule on the Drawings.
 - 1. Fixtures shall be smooth, watertight, and installed complete in every respect including required wall hangers, stops, drains, traps, fittings, and connections.
- B. Fixture Supports: Where required, carriers shall be Zurn or Jay R. Smith concealed carriers.

2.07 MISCELLANEOUS EQUIPMENT

- A. Floor Cleanout (FCO): Watts CO-200-RFC7 adjustable floor cleanout, epoxy coated cast iron body, with gas and watertight brass tapered thread plug. Provide size equal to piping served with maximum size of 4". Adjustable nickel-bronze top.
- B. Wall Cleanout (WCO): Sanitary tee with threaded raised-nut or countersunk-nut cleanout plug located behind Zurn Z-1468 round stainless steel wall access cover.
- C. Water Hammer Arrestor (Shock Absorber): Plumbing and Drainage Institute (PDI) listed.
 - 1. Size #100 PDI – (0-11 Fixture Units)
 - 2. Size #200 PDI- (012-32 Fixture Units)
 - 3. Size #300 PDI – (33-60 Fixture Units)

- D. Vacuum Breaker: Watts Model N36, 3/4" size, 20 CFM capacity.
- E. Strainer: Watts series 777, bronze body wye-type, 200 WOG rating, screwed end connections, 20-mesh stainless steel, monel, or bronze screen.
- F. Backflow Preventer: (BFP): Conforming to AWWA C506, FCCHR-USC Manual Section 10, and UL listed. Type, size, and capacities as indicated on the Drawings.

PART 3 – EXECUTION

3.01 GENERAL

- A. Refer to Section 200100 for general information as to the erection of piping systems.

3.02 WASTE, DRAINAGE, AND VENT SYSTEMS

- A. Pitch Sanitary, Waste, and Vent piping 1/4" per foot unless otherwise indicated.
- B. Provide cleanouts in the vertical position at the base of each sanitary and roof drain drop.
- C. Traps and running traps buried in or under floors shall have top cleanouts and extensions with brass covers.
- D. Vent stacks through the roof shall be cast iron and shall extend a minimum of 24" 36" above the finished roof level.
- E. Where an end circuit vent pipe from any fixture or line is connected to a vent line serving other fixtures, the connection shall be at least three feet above the highest fixture branch or high enough to prevent the use of the vent as a waste line.

3.03 DOMESTIC WATER SYSTEMS

- A. Provide 1/2" drain valves at low points so all parts of each system can be drained.
- B. No plumbing fixtures, devices, or piping shall be installed which will provide a cross or interconnection between a distributing supply for a drinking water system or domestic water system and a polluted or potentially polluted supply or drainage system or plant water system.
- C. Provide a suitable means to protect water piping from water hammer.
- D. Maintain a minimum 6" distance between hot water and cold water lines.
- E. Vent high points in the domestic hot water supply system. Pitch hot water piping up toward fixtures and risers for proper air relief. (Fixture supplies shall be considered vents.)

3.04 CLEANUP AND CORROSION PREVENTION

- A. Upon the completion of the work, thoroughly clean and flush the plumbing systems to sewer with water.
- B. Where corrosion from the effects of hot solder paste is evident, clean the area with a wash of bicarbonate of soda and water to neutralize the acid condition.
- C. Caulk around fixtures at floors and walls.

D. Fixtures, piping, and equipment shall be thoroughly cleaned.

3.05 TESTS

A. Sanitary, Waste, and Vent Piping: Test as required by Code.

B. Water piping shall be tested to a pressure of 100 psig for a duration of 30 minutes. Pressure drop during this period shall not exceed two psig. Leaks shall be repaired and the system retested. Notify the Architect/Engineer 24 hours prior to the performance of the test.

3.06 DISINFECTION

A. After the entire potable water system is completed, cleaned, and tested, disinfected in accordance with the Maine Plumbing Code.

END OF SECTION 220000

SECTION 230593 - TESTING, ADJUSTING AND BALANCING

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including General and Supplementary Conditions and Sections 00 and 01 of the Project Manual apply specifically to work of this Section.
- B. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 DESCRIPTION

- A. This section of the work includes all labor, equipment, materials, transportation, permits, inspections, and incidentals required to provide total mechanical systems testing, adjusting and balancing.
- B. Requirements include the balance of air and water distribution, equipment adjustments to provide design quantities indicated on the drawings, and electrical measurement and verification of performance of equipment.

1.03 SUBMITTALS

- A. The Contractor shall consult Section 200100 – “Substitutions” relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 200100 apply are as follows:
 - 1. TAB Contractor Qualifications
 - 2. Final Balancing Report

1.04 REFERENCE STANDARDS

- A. ASHRAE-Standard 111-Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air Conditioning, and Refrigeration Systems.
- B. ASHRAE —HVAC Applications Handbook: Chapter 34--Testing, Adjusting and Balancing.
- C. AABC--National Standards for Total System Balance.
- D. NEBB--Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.
- E. SMACNA--HVAC Systems--Testing, Adjusting and Balancing, Latest Edition.

1.05 QUALITY ASSURANCE

- A. The Testing, Adjusting, and Balancing (TAB) Contractor shall be either:
 - 1. A current member of NEBB (National Environmental Balancing Bureau) or AABC (Associated Air Balance Council) with 5 years of experience.

2. A registered professional engineer licensed in Maine that specializes in the adjusting and balancing of systems specified with a minimum of 10 years documented experience.
- B. The TAB Contractor Qualifications Submittal shall include company and personnel resume containing years in business, certification, a list of major projects completed, and a list of references.

PART 2 – PRODUCTS

2.01 INSTRUMENTATION

- A. Provide required instrumentation to obtain proper measurements. Application of instruments and accuracy of instruments and measurements to be in accordance with the requirements of Reference Standards and instrument manufacturer’s specifications.
- B. Instruments used for measurements shall be accurate and calibrated. Calibration and maintenance of all instruments to be in accordance with the requirements of Reference Standards.
- C. Provide necessary tools, scaffolding and ladders and other necessary instruments.

PART 3 – EXECUTION

3.01 PRELIMINARY PROCEDURES

- A. Obtain design drawings and specifications and become thoroughly acquainted with the design intent.
- B. Before commencing work, verify that systems are complete and operable. Ensure the following:
 1. Equipment is operable and in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Proper thermal overload protection is in place for electrical equipment.
 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 5. Duct systems are clean of debris.
 6. Correct fan rotation.
 7. Volume (balancing and terminal units) dampers are in place and open.
 8. Fire dampers are in place and open.
 9. Coil fins have been cleaned and combed.
 10. Access doors are closed and duct end caps are in place.
 11. Air outlets are installed and connected.

- 12. Duct system leakage has been minimized.
 - 13. Proper strainer baskets are clean and in place.
 - 14. Correct pump rotation.
 - 15. Hydronic systems have been flushed, filled, and vented.
 - 16. Service and balance valves in water distribution system are in place and open.
 - 17. Operating voltage on fan and pump motors do not exceed motor’s nameplate maximum voltage rating.
- C. Report to Architect/Engineer any defects or deficiencies noted during performance of services. Promptly report abnormal conditions in mechanical systems or conditions, which prevent system balance.

3.02 GENERAL REQUIREMENTS

- A. Perform testing, adjusting and balancing procedures on each system in accordance with the detailed procedures outlined in the referenced standards except as may be modified below.
- B. In areas containing ceilings, remove ceiling tile to accomplish balancing work. Replace tile when work is complete and provide new tile for any tile that was damaged by this procedure. If the ceiling construction is such that access panels are required for the work of this section and the panels have not been provided, inform the Architect/Engineer.
- C. Cut insulation, ductwork and piping for installation of test probes to the minimum extent necessary for adequate performance of procedures. Patch to maintain system integrity and pressure rating of systems.

3.03 TESTING, ADJUSTING, BALANCING - AIR SYSTEMS

- A. Place systems in operation with filters installed and control systems complete and operating.
- B. Make air quantity measurements in ducts by pitot tube traverse of entire cross sectional area of duct.
- C. Adjust register, grille and diffuser vanes and accessories to achieve proper air distribution patterns, uniform space temperatures, areas free from objectionable noise and drafts — that are within the capabilities of the installed system.
- D. Final air system measurements to be within the following range (unless directed otherwise by Engineer) of the specified CFM:

1. Fans	-5% to +10% of design value
2. Supply grilles, registers, diffusers	-10% to +10% of design value
3. Return grilles, registers	-10% to +10% of design value
- E. Measure and record static air pressure conditions across fans, coils and filters. Indicate in report if cooling coil measurements were made on a wet or dry coil and if filter measurements were made on a clean or dirty filter.
- F. Record pressure drop readings across all major system components and significant drops within duct systems.

- G. Permanently mark equipment settings including damper positions, valve positions, and control settings. Set and lock memory stops.
- H. Leave systems in proper working order by replacing belt guards, closing access doors and electrical boxes, and restoring temperature controls to normal operating settings.

3.04 HYDRONIC BALANCE

- A. Perform final hydronic balance after all systems have been flushed, cleaned, and filled.
- B. Test hydronic systems in all modes of operation. In general, balance systems in the most restrictive operating mode.
- C. Hydronic balance includes performance readings on all pumps, coils, heat exchangers, and flow measuring devices. Adjust pump flows to actual system heads by adjusting balancing valves.
- D. Report pressure drop readings across all major system components both for flow determination and deviations between actual and design values.
- E. Leave systems in proper working order by closing access doors and electrical boxes and leaving systems at normal operating settings.

3.05 TESTING, ADJUSTING AND BALANCING FINAL REPORT

- A. Submit testing, adjusting and balancing reports (TAB) in compliance with the referenced standards and the requirements listed below.
 - 1. Include brief system descriptions, deficiencies, corrections made, unresolved problems, and recommendations.
 - 2. Develop sketches for each system indicating all equipment, balancing related components, terminal devices, diffusers, grilles, registers, and valves. Use equipment nomenclature as defined in construction documents. Indicate room numbers, and correlate all devices to the balance report data.
 - 3. Include definition of abbreviations and formulas used in calculations.
 - 4. Include complete nameplate data for equipment.

3.06 FINAL ACCEPTANCE

- A. All testing and balancing shall perform to the satisfaction of both the Engineer and Owner prior to the acceptance of the testing and balancing report as meeting the requirements of this document.

END OF SECTION 230593

SECTION 230711 - HVAC AND PLUMBING INSULATION

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including General and Supplementary Conditions and Sections 00 and 01 of the Project Manual apply specifically to work of this Section.
- B. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 DESCRIPTION

- A. This section of the work includes all labor, equipment, materials, transportation, permits, inspections, and incidentals required to insulate the heating, ventilating, and air conditioning systems.

1.03 SUBMITTALS

- A. The Contractor shall consult Section 200100 – “Substitutions” relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 200100 apply are as follows:
 - 1. Pipe Insulation
 - 2. Duct Insulation
 - 3. Insulation Application Schedule

1.04 DEFINITIONS

- A. Finished Spaces: Spaces other than furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels, unless specifically listed below as an unfinished space.
- B. Unfinished Spaces: Mechanical Rooms.
- C. Unconditioned Spaces: Spaces exposed to near outside ambient temperatures.
- D. Outside: Areas beyond the exterior side of walls or above the roof, unexcavated spaces, and crawl spaces.
- E. Concealed: Not visible in finished or unfinished spaces. For example, above ceilings, below floors, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.
- F. Exposed: Visible from a finished or unfinished space.

1.05 DELIVERY AND STORAGE OF MATERIALS

- A. Packages or standard containers of insulation, jackets, cements, adhesives, and coatings delivered to the project site for use must have the manufacturer’s stamp or label attached giving name of manufacturer, brand, and description of material. Insulation shall be asbestos free.

- B. Contractor shall use whatever means necessary to protect insulation materials and accessories before, during, and after installation. Material that has become wet because of transit or job site exposure to moisture shall be removed from the jobsite.

1.06 FLAME SPREAD AND SMOKE DEVELOPED RATINGS

- A. Materials shall have a flame-spread rating of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with NFPA 255, ASTM E84, or UL 723.

PART 2 – PRODUCTS

2.01 PRE-FORMED PIPING INSULATION

- A. Fiberglass Insulation: Heavy density preformed fiberglass. Maximum thermal conductivity shall be 0.30 Btu-in/hr-ft² -°F at 220 °F. Insulation system shall be rated for maximum service temperature of 850 °F.
 - 1. Insulation Jacket: All service (ASJ) type with permeance not exceeding 0.02 perm when tested per ASTM E 96, Proc. A. Jackets in exposed locations shall have a white surface suitable for field painting. Provide vapor barrier as required by service.
 - 2. Fittings: Premolded, one piece, fiberglass, fittings finished with pre-formed PVC covers
- B. Elastomeric Insulation: Flexible, preformed, black, suitable for –70 °F to 220 °F service. Maximum thermal conductivity shall be 0.27 Btu-in/hr-ft² -°F at 100 °F. Fitting insulation shall be of the same material as used for pipe. Armstrong “Armaflex AP” or equal.
 - 1. Joint & Seam Sealant: Armstrong 520 adhesive.

2.02 DUCT INSULATION

- A. Ductwrap: Fiberglass wrap with foil-scrim-kraft (FSK) facing/vapor barrier, 1.0 lb/cubic foot density, maximum thermal conductivity shall be 0.29 Btu-in/hr-ft² -°F at 75 °F. mean temperature, maximum permeance rating of 0.02. Insulation shall meet the requirements of NFPA 90A & 90B and shall be UL rated.

PART 3 – EXECUTION

3.01 GENERAL

- A. Insulate after system tests have been completed and surfaces to be insulated have been cleaned of dirt, rust, and scale and are dry.
- B. Install insulation with jackets drawn tight and cement down longitudinal and end laps.
- C. Do not use scrap pieces where a full-length section will fit.
- D. Insulation shall be continuous through sleeves, wall, and ceiling openings except at fire dampers in duct systems and pipe penetrations through fire rated assemblies.
- E. Extend surface finishes to protect ends and raw edges of insulation.
- F. Apply coatings and adhesives at the manufacturer’s recommended coverage.
- G. Individually insulate piping and ductwork. Bevel and seal the edges of exposed insulation.

H. Insulation shall present a neat, workmanlike appearance.

3.02 PIPE INSULATION

- A. Pipe insulation shall be continuous through pipe hangers, guides, and anchors. Where pipe is supported by insulation, install insulation shields as specified in Section 20 01 00. Insulate through insulation saddles.
- B. Where penetrating roofs and exterior walls, insulate piping to a point flush with the underside of deck or wall and seal with a vapor barrier coating.
- C. Unless otherwise indicated, do not insulate the following:
 - (a) Chrome plated pipes and fire protection piping.
 - (b) Vibration isolating connections.
 - (c) ASME Stamps, nameplates, access plates, etc.
 - (d) Hydronic specialties: Low water cutoff, relief valves, relief valve discharge piping, pressure reducing valves, and expansion tanks.
 - (e) Unions and flanges at equipment required for frequent service.

3.03 DUCT INSULATION

- A. Flexible Blanket (Ductwrap): Butt edges of insulation tightly and seal joints and breaks with FSK tape in accordance with manufacturer's recommendations. Sagging of ductwrap insulation shall not be permitted. Carry insulation over standing seams and trapeze type hangers.

3.04 PIPE INSULATION APPLICATION SCHEDULE

<i>Service</i>	<i>Thickness</i>	<i>Material/Jacket</i>
Domestic Cold Water Piping:		
1-1/2" and smaller	1/2"	Fiberglass with ASJ
Domestic Hot Water/RHW Piping:		
1-1/4" and smaller	1"	Fiberglass with ASJ
Interior Roof Drain / Rain Leaders	1/2"	Elastomeric (As Required to prevent Condensation)
Heating Water Supply & Return Piping (Based on 200 °F maximum)		
1-1/2" to 4"	2"	Fiberglass with ASJ
1-1/4" and smaller	1-1/2"	

**For piping smaller than 1-1/2" and located in partitions within conditioned spaces, reduction of these thicknesses by 1" shall be permitted but not to a thickness less than 1".*

3.05 DUCT INSULATION APPLICATION SCHEDULE

<i>Service</i>	<i>Thickness</i>	<i>Material/Jacket</i>
Energy Recovery Ventilator Ductwork:		
Outside Air Intake from Unit to Exterior	1-1/2"	Ductwrap, FSK
Exhaust Air from within 10' of Exterior	1-1/2"	Ductwrap, FSK
Heat Pump Supply & Return Ductwork	1-1/2"	Ductwrap, FSK
Outside Air Duct from Intake Louver to Units (Heat Pumps, ERVs)	2"	Ductwrap, FSK
Exhaust Duct from Exterior to Exhaust Fan or to a point 10' interior of the Building.	1-1/2"	Ductwrap, FSK

END OF SECTION 230711

SECTION 230900 – CONTROLS

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including General and Supplementary Conditions and Sections 00 and 01 of the Project Manual apply specifically to work of this Section.
- B. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 DESCRIPTION

- A. This section of the work includes all labor, equipment, materials, transportation, permits, inspections, and incidentals required to provide complete and functional heating and ventilation control systems.

1.03 SEQUENCE OF OPERATION

- A. Provide a system of electric/electronic controls and/or packaged digital controllers to achieve the sequence of operation described on the Drawings. The system shall include all transformers, relays, switches, valves, dampers, actuators, and other components required for a complete and fully operational system whether specifically indicated or not.

1.04 SUBMITTALS

- A. The Contractor shall consult Section 200100 – “Substitutions” relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 200100 apply are as follows:
 - 1. Sequence of Operation
 - 2. Controllers
 - 3. Thermostats
 - 4. Sensors

PART 2 – PRODUCTS

2.01 CONTROLLERS

- A. Packaged digital controllers as indicated on the Drawings and/or necessary to meet the Sequence of Operations.

2.02 THERMOSTATS

- A. Digital, low voltage, heat only, mercury-free, thermostat with large display. Equip with mechanical range stops to limit temperature to 55 - 75 °F (adjustable). Thermostats shall be compatible with zone controls, zone valves and equipment controlled.

2.03 SENSORS

- A. Sensors as indicated on the Drawings and/or necessary to meet the Sequence of Operations.

PART 3 – EXECUTION

3.01 ELECTRICAL

- A. Low voltage (less than 115 volt) wiring associated with the HVAC system and control shall be accomplished under this Section. The work shall be performed by licensed electricians in accordance with the National Electrical Code.

3.02 SYSTEM INSTALLATION

- A. General: The control equipment and connecting wiring shall be installed in a neat and workmanlike manner by trained mechanics under direct supervision of the control contractor, conforming to all applicable state and local codes.

3.02 CALIBRATION AND ADJUSTMENTS

- A. After completion of the installation, perform final calibrations and adjustments of the equipment provided under this contract and supply services incidental to the proper performance of the control systems.

3.03 START-UP ACCEPTANCE PROCEDURE AND TESTING

- A. Provide start-up and testing assistance for mechanical equipment and systems.
- B. Upon completion of calibration, the Contractor shall start-up the systems and perform functional testing and run diagnostic tests to ensure proper operation and compliance with the specified Sequence of Operation.
 - 1. Run systems through all described control sequences in an orderly manner and verify correct and proper operation of all equipment, controls and systems. Document any deficiencies, correct and retest.
- C. An acceptance test in the presence of the Owner's Representative or Engineer shall be performed if requested.

3.04 TRAINING

- A. Provide one (1) hour of training for the building operators. This training shall be "hands- on" type at the project site. A mutual agreement on the scheduling of this training class will be made between the owner and the contractor. The intent of this training is that one (1) hours of training will occur before the owner accepts the system; the remaining hour is to follow after the owner has accepted beneficial use.

END OF SECTION 230900

SECTION 232000 - HYDRONIC HEATING SYSTEM

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including General and Supplementary Conditions and Sections 00 and 01 of the Project Manual apply specifically to work of this Section.
- B. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 DESCRIPTION

- A. This section of the work includes all labor, equipment, materials, transportation, permits, inspections, and incidentals required to provide complete and functional heating systems.

1.03 SUBMITTALS

- A. The Contractor shall consult Section 200100 – “Substitutions” relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 200100 apply are as follows:
 - 1. Piping Materials
 - 2. Unit Heaters
 - 3. Fintube Radiation
 - 4. Hydronic Specialties

PART 2 – PRODUCTS

2.01 PIPING MATERIALS

- A. Refer to Pipe Specification Sheets at the end of Section 20 01 00 for typical pipe & fittings.

2.02 UNIT HEATERS

- A. Provide as indicated and scheduled on the Drawings.

2.03 FINTUBE RADIATION

- A. Provide as indicated and scheduled on the Drawings.

2.04 HYDRONIC SPECIALTIES

- A. Refer to the Pipe Specification Sheets at the end of Section 20 01 00 for typical system valves.
- B. Drain Valves: Provide ball valves with 3/4" hose connection.
- C. Balancing Valves: TACO Accu-flow, full size of the pipe unless noted otherwise.
- D. Air Vents: Taco Hy-Vent
- E. Manual Air Vents: Line size air chamber with length of 3/8" pipe and gate valve at the top.

PART 3 – EXECUTION

3.01 PIPING

- A. Refer to Section 200100 for general information as to the erection of piping systems.

3.02 ELECTRICAL

- A. Low voltage (less than 115 volt) wiring associated with the HVAC system and control shall be accomplished under this Section. The work shall be performed by licensed electricians in accordance with the National Electrical Code.

END OF SECTION 232000

SECTION 233000 – HVAC AIR DISTRIBUTION

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including General and Supplementary Conditions and Sections 00 and 01 of the Project Manual apply specifically to work of this Section.
- B. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 DESCRIPTION

- A. This section of the work includes all labor, equipment, materials, transportation, permits, inspections, and incidentals required to provide air distribution systems to accommodate complete and functional heating and ventilation systems.

1.03 SUBMITTALS

- A. The Contractor shall consult Section 200100 – “Substitutions” relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 200100 apply are as follows:
 - 1. Energy Recovery Ventilators (ERV)
 - 2. Louvers
 - 3. Air Devices (Diffusers, Registers, & Grilles)
 - 4. Range Hood & Fan
 - 5. Ductwork and Accessories

PART 2 – PRODUCTS

2.01 ENERGY RECOVERY VENTILATORS (ERV)

- A. Provide as indicated and scheduled on the Drawings.

2.02 LOUVERS

- A. Provide as indicated and scheduled on the Drawing

2.03 AIR DEVICES (DIFFUSERS, REGISTERS, & GRILLES)

- A. Provide Air Devices (Diffusers, Registers, and Grilles) as indicated and scheduled on the Drawings.

2.04 RANGE HOOD & FAN

- A. Provide Range Hood with automatic fire suppressions and automatic range fuel shut-off as indicated on the Drawings and described in the Kitchen Ventilation Notes.
- B. Install in accordance with the manufacturer’s published installation instructions.

2.05 DUCTWORK AND ACCESSORIES

- A. Rectangular Low Pressure Ductwork: Construct with galvanized steel in accordance with the following table of duct sizes OR the latest ASHRAE Guide and Data Book, whichever is stricter, unless otherwise noted.

<i>Dimension of Longest Side (in.)</i>	<i>Minimum Sheet Metal Gauge</i>
Up thru 12	26
13 - 30	24
31 - 42	22
43 - 60	20
61 and greater	18

1. Methods of fabrication shall be in strict accordance with those set forth in the latest SMACNA Standards for Low and Medium Pressure Ductwork unless otherwise shown on the Drawings.
 2. Branches and turns shall be made with long radius elbows and fittings if space allows. If long radius elbows are not used, elbows 18” wide and larger shall be provided with fixed double wall airfoil turning vanes. Square elbows less than 18” shall be provided with single wall turning vanes. Square elbows with outside corners cut at 45° or rounded will not be accepted.
- B. Round Low Pressure Ductwork: Construct in Accordance with the latest SMACNA HVAC Duct Construction Standards for round and oval duct construction. Ducts larger than 8” shall employ spiral seams. Metal gauge shall be as outlined in SMACNA for 2” inches w.g. static pressure.
 - C. Dampers and deflectors shall be minimum 22 gauge and stiffened as required. Splitter dampers shall not be accepted.
 - D. Flexible Insulated Ductwork: black polyester core, fiberglass insulation to R4.2 or as indicated on drawings, reinforced vapor barrier jacket. Maximum flame spread / smoke developed 25/50. (Hart & Cooley)
 - E. Dampers and Actuators: Motor operated dampers shall have 16 gauge galvanized steel parallel blades with neoprene seals, compressible metal jamb seals, and concealed linkage. Ruskin CD36 with Belimo LF24-S direct coupled damper actuator.
 - F. Fire Dampers: Dynamic curtain type fire dampers meeting the requirements of the latest edition of UL Standard 555. Suitable for application in dynamic or static HVAC systems. Ruskin Model DIBD10
 1. Fire Resistance: 1½ hours in accordance with UL 555 (for penetrations through barriers with fire resistance ratings less than 3 hours)
 2. Dynamic Closure Rating: Dampers shall be classified for dynamic closure to 2000 fpm and 4 inches w.g. static pressure.
 3. Mounting: Vertical or Horizontal as required.
 4. Fusible Link: 165 degrees F (74 degrees C).

5. Style: B style (rectangular connection, blades out of air stream) or LR style (round connection, blades out of air stream).

PART 3 – EXECUTION

3.01 EQUIPMENT

- A. Install in accordance with good practice and published manufacturer's installation instructions.

3.02 DUCTWORK

- A. Sizes and general arrangement as well as methods of connecting air devices and equipment shall be as indicated or to meet the requirements for a complete installation.
- B. The Drawings do not necessarily show every fitting or offset required to accommodate the building structure, crossing ducts, the work of other trades, etc. The Contractor, as part of the work, shall complete minor alterations and transitions.
- C. Ductwork shall be tight, properly sealed, and installed to minimize pressure drop. Run ducts as straight as practical and make transitions as streamlined as practical. Elbows shall have a minimum inside radius of 1/3 the duct width or shall be provided with turning vanes.
- D. Duct and Plenum Sealing: All traverse joints, longitudinal seams and duct wall penetrations shall be sealed. Pressure sensitive tape shall not be used as the primary sealant.
 1. Spiral Lock seams in round or flat oval duct operating at static pressure less than 2" w.c. do not need to be sealed.
- E. Flexible ductwork may be used only where indicated on the plans and shall not exceed 48" in length unless specifically dimensioned on the plans. Do not install above "hard" ceilings or other inaccessible locations.
- F. Access doors shall be provided where shown and wherever required for ready access to operating parts of any kind.

3.03 FIRE DAMPERS

- A. Inspect areas to receive dampers. Notify the Engineer of conditions that would adversely affect the installation or subsequent utilization of the dampers. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Install dampers at locations indicated on the drawings and in accordance with manufacturer's UL approved installation instructions.
- C. Dampers must be accessible to allow inspection and replacement of components. The installer shall furnish any access door in the ductwork to provide this access.
- D. Install dampers square and free from racking with blades running horizontally.
- E. Do not compress or stretch damper frame into duct or opening.

3.04 ELECTRICAL

- A. Low voltage (less than 115 volt) wiring associated with the HVAC system and control shall be accomplished under this Section. The work shall be performed by licensed electricians in accordance with the National Electrical Code.

END OF SECTION 233000

SECTION 238143 – VARIABLE REFRIGERANT VOLUME (VRV) HEAT PUMP SYSTEM

PART 1 – GENERAL

1.01 GENERAL NOTES

- A. The general provisions of the Contract, including the General and Supplementary Conditions and Divisions 00 and 01 of the Project Manual apply specifically to this Section. The Contractor shall consult these Sections in detail and will be responsible for the work indicated and governed by the conditions set forth therein.

1.02 SCOPE

- A. The Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, inspections, and incidentals required to install and leave in place complete and fully operative air conditioning systems.
- B. Materials entering into the work shall be new and of the quality specified, otherwise to be of the best commercial quality obtainable for the purpose. The work shall be performed in the best and most substantial manner in accordance with the standards of the trade and all applicable codes.
- C. Work and materials shall be in accordance with the Drawings and Specifications even though the specified work may exceed the minimum requirements of applicable codes, ordinances, and regulations.

1.03 SYSTEM DESCRIPTION

- A. The system shall be variable refrigerant flow, variable capacity, heat recovery type, heat pump air conditioning variable refrigerant volume type split system. The system shall consist of multiple evaporators using PID control, connected to a single condenser unit. The condenser shall be an air-cooled, heat pump variable refrigerant flow (VRV) heating and air-conditioning system, with inverter driven variable speed compressor(s), using R-410A refrigerant. All indoor units are each capable of operating separately with individual temperature control.
- B. Condensing units shall be interconnected to indoor units in accordance with the equipment manufacturer's engineering data book. The indoor units shall be connected to the outside unit utilizing the equipment manufacturer's specified piping joints and headers to ensure correct refrigerant flow and balancing.
- C. Heat Recovery - For heat pump systems, operation of the system shall permit either cooling or heating of individual indoor units simultaneously. Each indoor unit or group of indoor units shall be able to provide set temperature independently via a local remote controller.

1.04 INSTALLATION REQUIREMENT

- A. The systems must be installed by a manufacturer certified factory trained contractor/dealer with complete knowledge of the systems installation requirements.

1.05 BASIS OF DESIGN

- A. The HVAC equipment basis of design is Daikin AC. The Contractor shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein. In any event, the contractor shall be responsible for all specified items and intents of this document without further compensation.

1.06 INSTALLER TRAINING REQUIREMENT

- A. The systems must be installed by a manufacturer certified trained contractor/dealer with complete knowledge of the systems installation requirements.

1.07 BASIS OF DESIGN

- A. The HVAC equipment basis of design is Daikin AC. The Contractor shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein. In any event, the contractor shall be responsible for all specified items and intents of this document without further compensation.

1.08 SUBMITTALS

- A. The Contractor shall consult Section 200100 – “Substitutions” relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 200100 apply are as follows:
 - 1. VRV Heat Pump System
 - (a) Outside Unit
 - (b) Inside Units
 - (c) Branch Selector Boxes
 - (d) Interconnecting Refrigerant Piping & Accessories
 - (e) Controls (including supplemental heat control)
 - (f) Wiring Diagrams

PART 2 – PRODUCTS

2.01 OUTDOOR UNIT

- A. Provide outdoor Air-cooled, Heat Recovery Unit as indicated and scheduled on the Drawings.
- B. The outdoor units shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of a scroll compressor, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separator, service ports and suction line accumulator. Liquid and suction lines must be individually insulated between the outdoor and indoor units.
- C. The systems will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.
- D. The outdoor units shall be modular in design and should allow for side-by-side installation with minimum spacing.

- E. The following safety devices shall be included on the condensing units; high pressure switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
- F. Unit Cabinet: The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

2.02 INDOOR UNITS

- A. Provide Indoor Units as indicated and scheduled on the Drawings.
 - 1. Controllers as indicated and required to meet Sequence of Controls.
- B. Units shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
- C. All refrigerant lines shall be insulated from the outdoor unit.
- D. The indoor units shall be equipped with a return air thermistor.
- E. The indoor units will be separately powered with 208~230V/1-phase/60Hz.
- F. Fan: The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available. The airflow rate shall be available in high and low settings. The fan motor shall be thermally protected.
- G. Coil: Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
- H. Control: The unit shall have controls provided by the manufacturer to perform input functions necessary to operate the system.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. The VRV Heat Pump system shall be installed in strict compliance with the Manufacturer's published installation instructions and recommendations. The installing personnel shall be factory-certified and qualified to complete the system installation.
- B. Install equipment level and plumb, maintaining manufacturer's recommended clearances.
- C. Install equipment, piping and connections to allow adequate service and maintenance.

3.02 TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain the VRV system.

END OF SECTION 238143

SECTION 26 00 00

GENERAL REQUIREMENTS FOR ELECTRICAL WORK

Part One: General

1.1 General Requirements

1.1.1 Definition of Work

Conditions of the Contract, Specifications, Change Orders, Addenda and Drawings apply to work of this section.

1.1.2 Provisions

As used in this section, "provide" means "furnish and install", "furnish" means "to purchase and deliver to the project site complete with every necessary appurtenance and support and to store in a secure area in accordance with manufacturers instructions", and "install" means "to unload at the delivery point at the site or retrieve from storage, move to point of installation and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project".

1.1.3 Existing Site Conditions – Responsibilities Prior to Bid

Before submitting a bid, the Electrical Subcontractor shall visit and carefully examine site to identify existing conditions and difficulties that may affect the work of this Section. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions.

1.1.4 Existing Site Conditions – Responsibilities Prior to Starting Work

Before starting work in a particular area of the project, the Electrical Subcontractor shall examine the conditions under which work must be performed including preparatory work performed under other Sections of the Contract, or by the Owner and report conditions which might adversely affect the work in writing to the Engineer. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.

1.2 Applicable Codes and Standards

1.2.1 Work

All work shall be in accordance with the laws, rules, codes, and regulations set forth by Local, State, and Federal authorities having jurisdiction. All products and materials shall be manufactured, installed and tested as specified, but not limited to the latest accepted edition of the following codes, standards and regulations:

NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
NEC	National Electrical Code (NFPA 70)
UL	Underwriters Laboratory
NESC	National Electrical Safety Code
FM	Factory Mutual Association
MUBEC	Maine Uniform Building Code
Local AHJ	Local and State building, electrical, fire and health department and public safety codes agencies.

1.2.2 Code Conflicts

When requirements cited in this Paragraph conflict with each other or with Contract Documents, the most stringent requirements shall govern conduct of work. The Engineer may relax this requirement when such relaxation does not violate the ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing. Should the Electrical Subcontractor perform any work that does not comply with the requirements of the applicable building codes, state laws, and industry standards, he shall bear all costs arising in correcting these deficiencies.

1.3 Contract Documents

1.3.1 Work to be Provided

Work to be provided under this division is shown on the electrical drawings listed in Division 1, General Requirements and in these Contract Specifications.

1.3.2 Coordination of Work

The listing of electrical drawings does not limit the responsibility of determining the full extent of work that is required by these contract documents. The Electrical Subcontractor shall refer to the drawings and other specification sections included in the complete Contract Package, that indicate types of construction with which work of this section must be coordinated. The General Contractor shall coordinate the work of all trades including that of the electrical contractor, with all other subcontractors to determine whether there will be any interference with the electrical work. If the Electrical Subcontractor fails to check with the General Contractor and the electrical work is later found to interfere with the work of other subcontractors, then he shall make necessary changes, without additional cost to the Owner, to eliminate such interference.

1.3.3 Intent of Design

Drawings are diagrammatic and indicate the general arrangement of systems and work to be included in the Contract. Information and components shown on riser diagrams or called for in the specifications but not shown on plans, and vice versa, shall apply and shall be provided as though required expressly by both. The contract documents are not intended to indicate and specify each component required, but do require that the components and materials be provided for a complete and operational installation.

1.3.4 Discrepancies in Documents

Each bidder shall be responsible for examining the drawings and specifications carefully before submitting his bid, with particular attention to errors, omissions, conflicts with provisions of laws and codes imposed by authorities having jurisdiction, conflicts between portions of drawings, or between drawings and specifications, and ambiguous definition of the extent of coverage in the contract. Any such discrepancy discovered shall be brought to the immediate attention of the Engineer for correction. Should any of the aforementioned errors, omissions, conflicts or ambiguities exist in either or both the drawings and specifications, the Electrical Subcontractor shall have the same explained and adjusted in writing before signing the contract or proceeding with work. Failure to notify the Engineer in writing of such irregularities prior to signing the Contract will cause the Engineer's interpretation of the Contract Documents to be final. No additional compensation will be approved because of discrepancies thus resolved.

1.3.5 Conflicts with Codes and Regulations

The drawings and these specifications are intended to comply with all the above mentioned Codes, Rules and Regulations. If discrepancies occur, the Electrical Subcontractor shall immediately notify the Engineer in writing of said discrepancies and apply for an interpretation and, unless and interpretation is offered in writing by the Engineer prior to the execution of the contract, the applicable rules and regulations shall be complied with as a part of the contract.

Part Two: Scope of Work

2.1 General Requirements

2.1.1 General Scope

The work to be accomplished under these specifications includes providing all labor, materials, equipment, consumable items, supervision, administrative tasks, tests and documentation required to install complete and fully operational electrical systems as described herein and shown on the Drawings.

2.1.2 Administrative Responsibilities

The Electrical Subcontractor shall file plans, obtain permits and licenses, pay fees and obtain necessary inspections and approvals from authorities that have jurisdiction, as required to perform work in accordance with all legal requirements.

2.1.3 Coordination with Local Utility Companies

The Electrical Subcontractor shall coordinate with the local Power, Telephone, and Cable System Utilities. The Electrical Subcontractor shall be responsible for paying any Utility charges and excess costs. The Electrical Subcontractor shall perform all work in accordance with utility company requirements.

2.2 Work to be Provided Under this Division

2.2.1 General Scope

The Work shall be complete from point of service to each outlet or device with all accessory construction and materials required to make each item of equipment or system complete and ready for operation. The work shall include but not be limited to the following. The Electrical Subcontractor shall provide:

- A. **Service Entrance:** Furnish all primary riser equipment, duct banks and secondary service conductors from transformer to main disconnect switch. Coordinate all work with the local Utility (Versant Power) and furnish all materials and equipment in compliance with their requirements.
- B. **Utility Metering:** Intent is that metering equipment will be installed in a utility specified CT cabinet located on the side of the building (or in the transformer pad) prior to the service conductors dropping underslab. The meter socket will be mounted on the wall adjacent to the CT cabinet.
- C. **Grounding System:** Provide a complete grounding system and all equipment and interconnection wiring.
- D. **Temporary Power:** Any and all charges (if required) for having temporary service provided to the facility, and all equipment, wiring and lighting as required and defined later in this specification section.
- E. **Service Entrances for Other Utilities:** Intent is to reuse existing telephone, data and cable TV services to the building.
- F. **Power Distribution Systems:** Provide power and lighting distribution systems including service panelboards, transformers, overcurrent devices, raceway, cable and wire.
- G. **Feeder and Branch Circuit Wiring:** Provide feeder and branch circuits and devices for power to equipment and convenience receptacles. This includes branch wiring to system control panels furnished under other sections.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

- H. **Motor Circuit Wiring:** Provide all motor wiring, safety disconnects, and motor starters unless integral with equipment.
- I. **Interior Lighting Systems:** Provide complete interior lighting system including normal and emergency fixtures, exit signs, lamps, controls, trim and accessories.
- J. **Exterior Lighting Systems:** Provide complete exterior lighting system including building and site lighting fixtures, poles, controls, lamps and accessories.
- K. **Fire Alarm Systems:** Provide complete fire alarm and detection system including pull stations, heat detectors, area smoke detectors, duct smoke detectors, indicating appliances, remote annunciation devices, water flow and tamper switch wiring, auxiliary contacts for equipment interlocking, and other devices shown on the Drawings.
- L. **Telephone and Data Systems:**
Provide conduits, pathways, device boxes, and wiring back to the IT room. Furnish (2) data and (1) telephone to each jack location. Jacks, equipment, termination and final punch down to be furnished by others.
- M. **Cable Television Systems:** Shall be furnished as part of the Data System.
- N. **Security System:** Provide 120V circuits for control transformers and pathways back to the IT room for security control wiring.
- O. **Radio/Intercom System:** Provide work boxes for speakers, pathways and wiring back to the Intercom System located at the Day Watch room, for intercom and radio equipment to be provided by the Owner's radio system consultant. Relocate the antenna leads to the new location for the Intercom and receiver system within the Day Watch room.
- P. **Control Wiring:** Provide control wiring not provided by Division 15000.
- Q. **Supports and Fittings:** Provide all support material and hardware for raceway, cable tray and electrical equipment.
- R. **Terminations:** Provide terminations of all cable and wire unless otherwise noted.
- S. **Penetrations:** Provide all building wall, floor and roof penetrations for raceway and cable tray where not provided by the General Contractor.
- T. **Other Items Furnished By Others:** Install the following equipment furnished by others:
 - 1. Motors
 - 2. Control Panels

2.3 Work not Included Under this Division

2.3.1 Related Work Included in Other Sections

The following work is not included in this Section and shall be performed under other sections:

- A. Excavation and backfill.

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- B. Concrete work, including concrete housekeeping pads and other pads and blocks for vibrating and rotating equipment.
- C. Cutting and patching of masonry, concrete, tile, and other parts of structure, with the exception of drilling for hangers and providing holes and openings in metal decks. The Electrical Subcontractor shall identify locations of penetrations, excavations, structural supports, etc. required for the completion of the Work of this Section to the General Contractor in a timely manner.
- D. Installation of access panels in ceilings and wall construction.
- E. Painting, except as specified herein.
- F. Temporary water, heat, gas and sanitary facilities for use during construction and testing.
- G. Outdoor air intake or exhaust louvers.
- H. Cathodic anti-corrosion protection for buried piping and tanks.
- I. Control wiring specifically indicated as part of Division 15.

2.4 General Equipment and Materials Requirements

2.4.1 General Requirements

All equipment and materials shall be new and of the quality specified. All materials shall be free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged during construction shall not be repaired at the jobsite, but shall be replaced with new materials.

2.4.2 Representation of Equipment

All equipment installed on this project shall have local representation, local factory authorized service and a local stock of repair parts.

2.4.3 Warranties

No equipment or material shall be installed in such a manner as to void a manufacturer's warranty. The Electrical Subcontractor shall notify the Engineer of any discrepancies between the Contract Documents and manufacturer's recommendations prior to execution of the work. Refer to Division 1, General Requirements for Warranty Requirements.

2.5 Shop Drawings

2.5.1 General Requirements

After the Contract is awarded, but prior to proceeding with the Work, the Electrical Subcontractor shall obtain complete shop drawings, product data and samples from manufacturers, suppliers, vendors, and Subcontractors for all materials and equipment specified herein, and submit data and details of such materials and equipment for review by the Engineer. [Submission of such items shall follow the guidelines set in the General Section of the Specification Document.] Prior to submission of the shop drawings, product data and samples to the Engineer, the Electrical Subcontractor shall review and certify that the shop drawings, product data and samples are in compliance with the Contract Documents. Further, the Electrical Subcontractor shall check all materials and equipment after their arrival on the jobsite and verify their compliance with the Contract Documents. A minimum period of ten working days, exclusive of transmittal time will be required in the Engineer's office each time shop

drawings, product data and/or samples are submitted or resubmitted for review. This time period shall be considered by the Electrical Subcontractor when scheduling his Work.

2.5.2 Information to be included in Submittal

The shop drawing submittal shall include all data necessary for interpretation as well as manufacturer's name and catalog number. Sizes, capacities, colors, etc., specified on the drawings shall be specifically noted or marked on the shop drawings.

2.5.3 Information Not to be included in Submittal

Submittals shall contain only information specific to systems, equipment and materials required by Contract Documents for this Project. Do not submit catalogs that describe products, models, options or accessories, other than those required, unless irrelevant information is marked out or unless relevant information is highlighted clearly. Marks on submittals, whether by Contractor, Subcontractor, manufacturer, etc., shall not be made in red ink. Red is reserved for review process.

2.5.4 Responsibility of Submitted Equipment

The Engineer's review of such drawings shall not relieve the Subcontractor of responsibility for deviations from the Contract, Drawings or Specifications, unless he has in writing called the attention of the Engineer to such deviations at the time of the submission. The Engineer's review shall not relieve the Electrical Subcontractor from responsibility for errors or omissions in such drawings.

2.5.5 Proposal of Other Equipment

If the Electrical Subcontractor proposes an item of equipment other than that specified or detailed on the drawings which requires any redesign of the wiring or any other part of the mechanical, electrical or architectural layout, the required changes shall be made at the expense of the trade furnishing the changed equipment at no cost to the Owner.

2.5.6 Substitution of Equipment of Equal Quality

Manufacturer's names are listed herein and on the drawings to establish a standard for quality and design. Where one manufacturer's name is mentioned, products of other manufacturers will be acceptable if, in the opinion of the Engineer the substitute material is of quality equal to or better than that of the material specified. Where two or more manufacturer's names are specified, material shall be by one of the named manufacturers only.

2.6 Equipment Manuals

2.6.1 General Requirements

The Electrical Subcontractor shall provide three copies of operations and maintenance manuals for all items. These manuals shall be packaged with additional information including equipment cur sheets and as-built wiring diagrams. Manuals shall contain names and addresses of manufacturers and local representatives who stock or furnish repair parts for items or equipment.

2.6.2 Schedule

Deliver manuals no less than 30 days prior to acceptance of equipment to permit Owner's personnel to become familiar with equipment and operation prior to acceptance.

2.6.3 Instruction of Owner's Operating Personnel

Upon completion of installation or when Owner accepts portions of building and equipment for operational use, instruct the Owner's operating personnel in any and all parts of various systems. Such instructions shall cover period of control such as will take mechanical equipment through complete cycle. Make adjustments under actual operating conditions.

2.7 Record Drawings

2.7.1 General Requirements

As work progresses, and for duration of the Contract, the Electrical Subcontractor shall maintain a complete and separate set of prints of Contract Drawings at job site at all times and record work completed and all changes from original Contract. Drawings shall clearly and accurately include work installed as a modification or added to the original design. At completion of work and prior to final request for payment, the Electrical Subcontractor shall submit a complete set of reproducible record drawings showing all systems as actually installed.

Part Three: Execution

3.1 Wiring Methods

3.1.1 Requirements

Unless otherwise noted all wiring shall be installed in raceway as follows:

- A. **Power Distribution Outdoors:** All conduit installed outdoors, all risers between floors and conduit exposed to physical damage shall be rigid steel, rigid aluminum or intermediate metal conduit. Wiring installed underground shall be installed in rigid non-metallic, PVC conduit and as per the Contract Drawings.
- B. **Power Distribution Indoors:** Unless otherwise noted, all exposed power distribution wiring including wiring from the main switchgear to the panelboards and wiring in spaces with open ceilings shall be installed in electrical metallic tubing (EMT). All concealed indoor wiring including feeders and branch circuits shall be allowed to be furnished in properly supported MC cable assemblies.
- C. **Telephone, Data, Cable TV and Radio:** Telephone, Data, Cable TV and Radio wiring shall be furnished in ¾" minimum EMT conduits from devices identified on the plans in spaces between walls and inaccessible ceilings, with the EMT stubbing up a minimum of 6" above the wall and into the ceiling space. Surface mounted conduits shall also be EMT.
- D. **Fire Alarm System:** Shall be installed in red MC cable assemblies listed for use as fire alarm cable assemblies in concealed spaces and in EMT where exposed.
- E. **Security Systems Wiring:** Shall be installed neatly bundled and ty-wrapped and sufficiently supported by j-hooks or cable trays above accessible hung ceiling spaces, and in ¾" minimum EMT conduits between walls, with the EMT stubbing up a minimum of 6" above the wall and into the ceiling space.
- F. **Underslab Conduits:** Conduit installed under floor slabs shall be rigid nonmetallic conduit with rigid steel stub-ups.

3.1.2 Underground Wiring Methods

- A. All service laterals and service entrance conductors shall be installed in PVC. In areas subject to traffic, these conduits shall be concrete encased. Conduits encased in concrete can be provided type EB-20 minimum, or as required by the local Power Company. PVC Conduit spacers shall be used in compliance with the manufacturer's recommendations to insure proper spacing as detailed in the duct bank sections of the Contract Drawings.

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- B. Other wiring under 600 volts, including site lighting branch circuits and other conduits not required to be concrete encased shall be in direct buried Schedule 40 PVC conduits.
- C. Conduit installed in or below floor slabs shall be PVC with rigid steel stub-ups.

3.2 Work in Existing Facilities (Police Station)

3.2.1 Requirements

All construction activities shall be conducted with minimal disruption to the Owner's operation. Power outages, bus tie-ins, service change overs and the like shall be scheduled in writing with the Owner.

3.3 Equipment Arrangement and Access

3.3.1 Location of Equipment

Locate all equipment which must be serviced, operated or maintained in fully accessible positions. Minor deviations from the drawings may be made to allow for better accessibility at no additional cost to the Owner, but changes shall not be made without review by the Engineer. Minimum clearances in front of or around equipment shall conform to the latest applicable code requirements.

3.3.2 Arrangement of Equipment

The size of equipment shown on the drawings is based on the dimensions of a particular manufacturer. Where other manufacturers are acceptable, it is the responsibility of the Electrical Subcontractor to determine if the equipment he proposed to furnish will fit the space available. Layout drawings shall be prepared by the Subcontractor when required by the Engineer or Owner to indicate a suitable arrangement.

3.4 Equipment Labeling

3.4.1 Panelboards

All panelboards, cabinets and other specified equipment shall be labeled with engraved laminated plastic plates, minimum 3/4" high with 3/8" engraved letters.

3.4.2 Starters and Disconnect Switches

All starters, disconnect switches and other specified equipment shall be marked with engraved laminated plastic plates, minimum 1/2" high with 1/4" engraved letters. Where individual switches or circuit breakers in power or distribution panelboards do not have cardholders, they shall be marked with 1/2" high labels.

3.4.3 Empty Conduits

All empty conduits shall have labels tied to the pull string at each end of each empty conduit, marked as to identification of each end. Junction boxes with circuits provided for future use shall be labeled with appropriate circuit designation.

3.4.4 Panelboard Directories

Cardholders for panelboards shall be filled out with typewritten identification of each circuit, except that the word "spare" shall be written in soft pencil to identify all circuit breakers installed that are not used.

3.5 Temporary Light and Power

3.5.1 Requirements

The Electrical Subcontractor shall provide a temporary service to the building as required to provide electric light and power while the building is under construction and until the permanent feeders have been installed, tested and accepted by the Owner. Install and maintain a feeder or feeders of sufficient capacity for the requirements of each floor. The Electrical Subcontractor shall furnish, install and remove the temporary electrical power and lighting systems and pay for all labor, materials, and equipment required therefore. All such temporary electrical work shall meet the requirements of the National Electrical Code, the local utility company, and OSHA.

3.5.2 Payment of Electric Bills

The General Contractor shall pay the costs of all energy consumed by himself and by all of his subcontractors until final completion.

3.5.3 Temporary Lighting

The Electrical Subcontractor shall furnish all lamps, both initial and replacement, used for the temporary lighting system.

3.5.4 Equipment Provided by Others

The General Contractor and all subcontractors, individually, shall furnish all extension cords, portable lights and lamps therefore, sockets, motors, and accessories as required for their work.

3.5.5 Reimbursable Items

The General Contractor and all subcontractors shall reimburse the Electrical Subcontractor for the following:

- A. Any temporary wiring of a special nature, other than that specified above, required for their work.
- B. Any temporary wiring of construction offices and buildings used by them, other than the office of the General Contractor and the Clerk of the Works.

3.5.6 Removal of Equipment and Wiring

All temporary wiring, service equipment, and accessories thereto shall be removed by the Electrical Subcontractor when directed by the General Contractor.

END OF SECTION 26 00 00

SECTION 26 05 19

600 VOLT WIRE

Part One: General

1.1 General Requirements

1.1.1 Provisions

The provisions of Section 26 00 00, General Requirements for Electrical Work apply to the work of this section.

1.2 Applicable Codes and Standards

1.2.1 Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

ASTM B-3	Soft or Annealed Copper Wire
ASTM B-8	Concentric Lay Stranded Copper Conductors
NEMA WC-5	Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
NEMA WC-7	Cross-Linked Thermosetting Polyethylene Insulated Wire for the Transmission and Distribution of Electrical Energy
UL 44	Rubber Insulated Wires and Cables
UL 62	Flexible Cord and Fixture Wire
UL 83	Thermoplastic Insulated Wires and Cables

1.3 Submittals Required

1.3.1 Data Sheets

Manufacturer's product data sheets.

1.4 Manufacturers

Subject to compliance with the Specification Requirements:

- Anixter
- General Cable
- Rome Cable
- Approved Equal

Part Two: Products

2.1 General

2.1.1 Conductors

All conductors shall be annealed copper in accordance with ASTM B-3.

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2.1.2 Jacket

The jacket of all wire shall be printed with the following information:

- Manufacturer
- Size
- Insulation type
- Maximum voltage
- UL label

2.1.3 Insulation

All insulation shall be rated 600 for volts.

2.2 Power Wiring

2.2.1 Feeders and Motor Branch Circuits

Feeders and motor branch circuits shall be type THHN/THWN.

2.2.2 Description

All power wiring shall be stranded, Class B strand in accordance with ASTM B-8, minimum size #12 AWG.

2.3 Lighting and Receptacle Branch Circuits

2.3.1 Description

All lighting and convenience receptacle branch circuit wiring shall be in type MC cable assemblies, minimum size #12 AWG. Hospital grade circuits shall be installed in listed hospital grade MC cable assemblies, such as type HCF as manufactured by Southwire or approved equal as approved by the engineer and the local Authority Having Jurisdiction.

2.4 Control Wiring

2.4.1 Description

Wiring for control circuits shall be THHN/THWN stranded, with Class B strand in accordance with ASTM B-8, minimum size #14 AWG.

2.5 Fixture Wire

2.5.1 Description

Where the generator set is overloaded, fixture wire is required it shall be silicone rubber type SF-2.

Part Three: Execution

3.1 General

3.1.1 Installation

All wire shall be installed in accordance with Section 16000, Part 3.1 Wiring Methods.

END OF SECTION 26 05 19

SECTION 26 05 26

GROUNDING EQUIPMENT

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Provisions

The provisions of Section 26 05 00, General Requirements for Electrical Work apply to the work of this section.

B. Installation Compliance

The Contractor shall provide a complete grounding system including grounding electrodes, electrode conductors, bonding jumpers, equipment grounding conductors, connections and other materials as may be required for a complete installation. The completed system provided shall meet the requirements of the National Electrical Code and the interpretation of the Local Authority Having Jurisdiction.

1.2 APPLICABLE CODES AND STANDARDS

A. Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

NFPA 70	National Electrical Code
UL 467	Grounding and Bonding Equipment

B. Additional Grounding Requirements for Healthcare Facilities

In addition to other requirements, grounding in patient care areas shall be in accordance with Article 517 of the NEC.

1.3 SUBMITTALS REQUIRED

A. Equipment Data Sheets

Data sheets for chemical grounding systems, exothermal connection methods, and associated wiring.

1.4 MANUFACTURERS

A. Products shall be of firms regularly engaged in manufacture of grounding equipment.

PART TWO: PRODUCTS

2.1 GENERAL

A. Requirements

Provide all equipment, components and parts required to for a complete and operable system.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

2.2 GROUND RODS

A. Requirements

Ground rods shall be ¾-inch copper clad steel construction furnished in 10 foot lengths.

2.3 CONDUCTORS

A. Bare Grounding Conductors

Bare grounding conductors shall be soft drawn stranded copper, sized in accordance with NEC Article 250 unless otherwise noted on the Drawings.

B. Insulated Grounding Conductors

Insulated grounding conductors shall be stranded copper with Type TW, THW or THHN/THWN insulation. Grounding conductor shall be provided with green insulation for identification purposes.

2.4 CONNECTIONS

A. Welded Connections

Welded connections shall be exothermic reaction type, as manufactured by Cadweld, or approved equal. The contractor shall provide all molds, crucibles, weld metal, and any necessary materials or equipment required to make connections using this process.

B. Compression Connections

Compression lugs shall be short barrel, one-hole compression type for conductors #2/0 AWG and smaller and long barrel, two-hole compression type for conductors #3/0 AWG and larger.

2.5 GROUNDING BAR

A. Requirements

Provide a wall-mounted copper grounding bar, mounted 6 inches above finished floor. Grounding bar shall be connected directly to the grounding grid.

PART THREE: EXECUTION

3.1 GROUNDING ELECTRODE SYSTEM

A. Requirements

Grounding electrodes of the types shown on the Contract Drawings and as required by NEC shall be provided. Additional electrodes shall be provided if required by the local Authority Having Jurisdiction. All electrodes shall be bonded together to form the grounding electrode system.

B. Installation of Ground Rods

Ground rods shall be driven vertically with the upper end of the rod not less than 2-1/2 feet below finished grade. When conditions require, ground rods may be driven at an angle not to exceed 45 degrees from vertical, with the driven end facing outside of the grounding ring.

C. Installation of Grounding Ring Conductors

Grounding ring conductors shall be bare copper, sized as shown on the Contract Drawings and installed at a minimum depth of 2-1/2 feet below finished grade. Conductors encased in concrete footings, in or under floor slabs, and in duct banks shall be bare copper, sized as shown on the Contract Drawings. All connections made below grade or encased in concrete shall be exothermic weld type.

D. Connection to Structural Steel

Grounding grid conductors shall be connected to building structural steel as required by the NEC this shall include a connection to reinforcing steel in a minimum of one concrete footing. All connections to building steel shall be exothermic weld type.

E. Grounding Electrode Conductors

The electrical service and all separately derived systems shall be grounded in accordance with NEC Article 250. The grounding electrode conductor shall be copper, sized in accordance with Article 250 of the NEC or as shown on the Drawings.

3.2 EQUIPMENT GROUNDING SYSTEMS

A. Requirements

A separate, insulated copper conductor, with green colored insulation, shall be provided in all raceways and with every feeder, branch and control circuit, in addition to the grounded metallic conduit system. The equipment grounding conductor shall be grounded at both ends.

B. Connection of Equipment Grounding Conductors

Connections to equipment grounding busses shall use compression type termination lugs bolted to a clean, dry surface on the bus, free from any contaminants which may hinder the electrical continuity of the connection. The contractor shall provide any additional hardware and all drilling and tapping that may be required for this connection.

3.3 ADDITIONAL BONDING REQUIREMENTS

A. Grounding of Raceway Systems

All metallic raceways shall be electrically continuous and bonded to the grounding system.

B. Grounding of Cable Tray

Cable tray shall be bonded to the grounding system through the provision of a #2/0 AWG bare copper conductor installed on the exterior rail and supported at 6 foot intervals by a ground clamp. All conduit terminating at the cable tray shall be provided with grounding bushings and bonded to the cable tray grounding conductor.

C. Bonding of Electrical Equipment Busses

All switchgear, switchboard and motor control center grounding busses shall be connected to the grounding electrode system at both ends. Bonding conductor shall be equal to that sized for the feeder to the equipment as shown on the Contract Drawings.

D. Bonding of Other Systems

Interior metal water, gas and sprinkler piping shall be bonded as required by Article 250 of the NEC. The points of attachment of these bonding conductors shall be located in readily accessible locations.

END OF SECTION 26 05 26

SECTION 26 05 33

RACEWAY AND FITTINGS

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Provisions

Provisions of Section 26 00 00, General Requirements for Electrical Work apply to the work of this Section.

1.2 APPLICABLE CODES AND STANDARDS

A. Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

ANSI C80.1	Standard for Rigid Steel Conduit
ANSI C80.3	Standard for Electrical Metallic Tubing
ANSI C80.6	Standard for Intermediate Metal Conduit
UL 1	Flexible Metal Conduit
UL 6	Rigid Metal Conduit
UL 360	Liquid Tight Flexible Steel Conduit
UL 514B	Fittings for Conduit and Outlet Boxes
UL797	Electrical Metallic Tubing
UL870	Wireways, Auxilliary Gutters and Associated Fittings
UL1242	Intermediate Metal Conduit

1.3 SUBMITTALS REQUIRED

A. Manufacturers' product data sheets

1.4 MANUFACTURERS

A. In compliance with the Specification Requirements:

- Allied Tube and Conduit (Conduit)
- Wheatland (Conduit)
- Thomas and Betts (Fittings)
- Appleton (Fittings)
- Crouse Hindes/Cooper (Fittings)
- OZ Gedney (Fittings)
- Killark (Fittings)
- AFC Cable Systems (MC/LFMC)
- Southwire (MC/LFMC)
- Other manufacturers listed in the specification descriptions
- Approved equals

PART TWO: PRODUCTS

2.1 CONDUIT

A. Galvanized Rigid Steel Conduit (GRS)

Rigid steel conduit shall be manufactured from mild steel tube with a uniform protective coating of hot dipped zinc galvanizing inside and outside, including all threads. The conduit shall be furnished in nominal 10-foot lengths, with both ends threaded and furnished with a galvanized coupling on one end and a plastic thread protector on the other end.

B. Rigid Aluminium Conduit

Rigid aluminum conduit, couplings and elbows shall be manufactured of a suitable copper-free aluminum alloy. Conduit lengths shall be seamless throughout and shall have hard, smooth and gum-free interior coatings to facilitate the pulling-in of conductors. It shall be furnished in nominal 10-foot lengths, with both ends threaded and a coupling applied to one end of each length. Threads on the coupling end shall be coated with a special lubricant so that the coupling may be removed without difficulty. Threads on the end opposite the coupling shall be protected from damaged by a plastic cap.

C. Intermediate Metal Conduit (IMC)

Intermediate metal conduit shall be of steel piping with a uniform protective coating of hot dipped zinc galvanizing on the outside of the conduit, including all threads. The conduit shall be furnished in nominal 10-foot lengths, both ends threaded furnished with a galvanized coupling on one end and a plastic thread protector on the other end.

D. Electrical Metallic Tubing (EMT)

Electrical metallic tubing shall be constructed of zinc coated steel with an interior coating of lacquer or enamel to permit easier wire pulling.

E. Liquid Tight Flexible Metal Conduit (LFMC)

Liquid tight flexible conduit shall be constructed with a flexible core of galvanized steel and an oil and sunlight resistant PVC jacket to form a liquid tight raceway. The overall jacket shall be wrinklefree and suitable for use in temperatures from -25°C to +80°C.

F. Flexible Metal Conduit (MC)

Flexible metal conduit shall have an outer armor constructed of be hot dipped galvanized interlocked strip steel.

2.2 CONDUIT FITTINGS

A. Bushings

1. Insulated Bushings

Insulated bushings for conduit sizes 1-1/4 inches and larger shall have metal bodies and threads, with molded-on high impact phenolic thermosetting insulation to prevent conductor insulation damage. Bushings shall be Type “IBC” insulated bushings as manufactured by OZ Gedney or an approved equal. Insulated bushings for conduit sizes 1 inch and smaller may be of plastic, OZ Gedney Type "A", or an approved equal.

2. Insulated Grounding Bushings

Insulated grounding bushings shall be similar to the insulated bushings described above, except they shall have set screws to lock the bushings on the conduits and shall have mechanical type lugs attached. The lugs shall be sized to accept the ground wire sizes as set forth in the latest edition of the National Electrical Code, but in no case smaller than No. 8 AWG wire. Grounding bushings shall be Type “BLG” as manufactured by OZ Gedney or an approved equal.

3. Male Bushings

Male bushings shall be Thomas and Betts Corporation insulated throat chase nipples, or a product of equal construction. Bushings used only to pass conductors through metal partitions, etc. shall be OZ Gedney, Type "ABB".

4. Male Bushings

Bushings for use with EMT shall be OZ Gedney type “SBT” or approved equals.

B. Conduit Bodies

Conduit bodies for use with aluminum conduit shall be of copper free aluminum alloy. Those for use with steel conduit may be of galvanized, or cadmium plated cast iron, or of copper free aluminum alloy. All conduit fittings shall be provided with neoprene gaskets and sheet metal covers, except that cast covers shall be used for sized 1-1/2 inches and larger. Rigid conduit connections shall be threaded and EMT connections shall be set screw type. Cover screws shall be captive. All conduit fittings shall be as manufactured by Crouse Hinds, Appleton, Killark or approved equal.

C. Hubs

Water-tight conduit connections are required on all NEMA 3R, 4, and 4X enclosures and all electrical equipment located outdoors or in damp or wet areas. Where hubs or water-tight threaded connections are not provided as part of the enclosure, water-tight hubs shall be Myers "Scrutite", or approved equal. All other terminations shall be double locknut and bushing.

D. Fittings

Fittings for use with liquid-tight flexible conduit shall be zinc plated malleable iron Crouse Hinds type “CGB” or approved equal.

E. Locknuts

Locknuts shall be hot dipped galvanized steel or malleable iron. Standard locknuts shall be used for connections to NEMA 1 enclosures. Sealing locknuts with integral gasket shall be used for connections to NEMA 12 enclosures.

2.3 JUNCTION BOXES

A. Pull and Junction Boxes

Pull and junction boxes shall be of code gauge metal with continuously welded joints or of cast metal if called for on the Drawings. All junction boxes shall have gasketed screw covers. Boxes for use with aluminum conduits shall be of aluminum. Sheet steel boxes shall be galvanized after fabrications. Screws for galvanized steel box covers shall be made of brass. Screws for aluminum box cover shall be stainless steel.

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B. Boxes Installed in Concrete

Boxes installed in concrete shall be cast iron alloy or copper free aluminum.

C. Rating of Boxes

Unless otherwise shown on drawings, all boxes installed indoors shall be rated NEMA 1 and all boxes installed outdoors shall be rated NEMA 3R. Boxes located in fire walls, exterior walls, and at the ceiling of the top floor shall be sealed with UL approved fire sealant material to maintain the rating of the separation as well as providing air sealing to maintain the buildings thermal envelope. Boxes located on opposing sides of rated walls i.e. unit separations, must be at least 24” apart or treated with putty pads per IBC.

2.4 OUTLET BOXES

A. Outlet Boxes for Concealed Work

Outlet boxes for concealed work shall be pressed steel boxes, galvanized and not less than #12 gauge. Each ceiling outlet designated for a lighting fixture shall have a fixture support secured in place with bolts and nuts. Ceiling boxes shall be octagonal with lugs and screws for back plates.

B. Outlet Boxes Installed Outdoors

Outlet boxes installed outdoors, in concrete or exposed, shall be cast iron alloy or copper free aluminum with gasketed covers.

C. Outlet Box Accessories

Provide outlet box accessories as required for each installation, including box supports, mounting ears and brackets, wallboard hangers, box extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and to fulfill installation requirements for individual wiring situations.

2.5 WIREWAY

A. Wireway

Wireway shall be lay-in type, code gauge steel with dark gray epoxy paint finish inside and out.

B. Covers

Covers shall be hinged with captive screw fasteners for NEMA 1 & NEMA 3R wireway and gasketed quick release latch covers for NEMA 12 wireway.

2.6 SUPPORTS

A. Sizing

The Electrical Subcontractor shall size and provide all supports necessary for the installation of all raceway.

B. Channel Framing

Channel framing shall be manufactured by Unistrut, Kindort, B-Line or approved equal.

C. Indoor Locations

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In dry, non-corrosive areas, channel framing and angle shall be galvanized steel or aluminum and all nuts, bolts and hardware shall be carbon steel, cadmium plated or hot dipped galvanized. Ream clamps shall be galvanized steel or malleable iron.

D. Outdoor, Wet or Damp Locations

In outdoor, wet or damp areas channel framing and angle shall be aluminum or 304 stainless steel and nuts, bolts and hardware shall be 304 stainless steel. Beam clamps shall be hot dipped galvanized steel or malleable iron.

E. Corrosive Locations

In corrosive areas, channel framing shall be 316 stainless steel, PVC coated steel or PVC coated aluminum. Nuts, bolts and hardware shall be 316 stainless steel. Beam clamps shall be PVC coated.

F. Supports

Supports shall be sized with a minimum safety factor of four or 200 lbs. whichever is greater.

PART THREE: EXECUTION

3.1 GENERAL

A. Requirements

See Specification Section 26.05.00 Subsection 3.1 for Wiring Methods.

3.2 INSTALLATION

A. Conduit, EMT, Boxes and Enclosures

Conduit, EMT, boxes & enclosures shall be installed so that they are mechanically secure, electrically continuous and neat in appearance.

B. Exposed Runs

Exposed runs shall be installed to conform to the shape of the surface over which they are run. Where they are run over a plane surface, they shall be straight and true. All exposed conduits shall be run parallel and perpendicular to building column lines and walls. Diagonal runs will not be permitted. Conduit runs in groups shall be supported by means of common members made of channel framing. Group mounting is not required where the group consists of only two conduits. Machine bolts with expansion shields shall be used when fastening to solid masonry or concrete. Toggle bolts shall be used to fasten to hollow masonry.

C. Spacing

Unless otherwise approved, spacing between conduit supports shall not exceed ten feet. Conduits shall not be supported from structural members marked "Removable" on the structural drawings. Conduit hangers and supports shall be fastened to buildings and structural members only and not to any equipment or piping. Separate conduits a minimum of 6" from flues, steam and hot water lines. Install conduit above mechanical piping wherever possible.

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D. Conduit Supports

All conduit supports other than structural members shall be galvanized. The use of perforated strap or plumber straps will not be permitted.

Conduit up to 1-1/2 inches may be supported by one-hole malleable iron straps with clamp backs.

Conduit 2 inches and larger shall be supported by two-hole straps.

E. Conduit Run Lengths

Conduit runs shall not exceed 100 feet between boxes, fittings or devices.

PVC conduits run above grade shall be sufficiently supported to prevent sagging.

MC cables shall be neatly bundled and tie wrapped and sufficiently supported.

F. Use of Expansion Joints

All conduit crossing building or structure expansion joints shall be provided with approved expansion fittings.

3.3 BENDS

A. Field Bends

Field bends shall be made with approved bending tools. All field-formed bends shall be of maximum radius permitted by the design and construction conditions.

B. Exposed Conduit Changing Direction

Where a group of exposed conduits change direction, the bends shall have a common center in order to maintain the uniformity and neat appearance of the group, having regard for the minimum bending radius of the largest conduit in the group.

C. General

Bends shall be uniform radius and free from cracks, crimps or other damage to the conduit or its coating and shall not unduly flatten the conduit section.

3.4 JOINTS AND TERMINATIONS

A. Joints in Rigid Conduit

All joints in rigid conduit shall be threaded, using standard couplings. The use of running threads, threadless or split couplings is prohibited. When reaming out of conduit ends to remove burrs and rough edges, care shall be exercised to avoid excessive reaming which results in the weakening of the conduit wall at the end.

B. Tightening of Joints

All joints shall be made up wrench tight and with a minimum of wrench work in order to avoid wrench cuts.

C. Cut Threads

All cut threads shall be thoroughly painted with a coating of a rust inhibiting primer.

D. EMT Couplings and Fittings

MOUNT DESERT FIRE DEPARTMENT – STATION #1

EMT couplings and fittings shall be compression type on conduits up to 1–1/4 inch and double set screw type for conduits 1-1/2 inch and larger.

E. Conduit Terminations

All conduit terminations in panels, enclosures, outlet boxes and equipment shall be provided with bushings.

3.5 FLEXIBLE CONDUIT

A. Terminations

Flexible conduit shall be use to terminate all, lighting, motors, unit lanterns, transformers, pilot devices and vibrating equipment.

B. Liquitite Flexible Conduit

Liquitite flexible conduit and fitting shall be used outdoors and in all damp or wet areas, or where exposed to grease or oil.

C. Connections to Lighting Fixtures

Connections to lighting fixtures (lighting whips) shall be maximum length of 6 feet. All other flexible connections shall be maximum 24 inches.

3.6 PENETRATIONS

A. Penetrations through Slabs, Walls, Roofs

All penetrations through concrete slabs, masonry walls or roofs shall be provided with sleeves.

B. Sleeves

All sleeves shall be sealed to maintain the integrity of the structure. Fire resistant walls and floors shall be sealed with approved material, and shall maintain the original fire rating. All seals below grade shall be watertight, O.Z./Gedney type WSK or approved equal.

END OF SECTION 26 05 33

SECTION 26 24 16

PANELBOARDS

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Provisions

The provisions of Section 26 05 00, General Requirements for Electrical Work apply to the work of this section.

1.2 APPLICABLE CODES AND STANDARDS

A. Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

NEMA 250	Enclosures for Electrical Equipment
NEMA AB-1	Molded Case Circuit Breakers
NEMA KS-1	Enclosed Switches
NEMA PB-1	Panelboards
UL 50	Enclosures for Electrical Equipment
UL 67	Panelboards
UL 98	Enclosed and Deadfront Switches
UL 489	Molded Case Circuit Breakers and Circuit Breaker Enclosures
UL 943	Ground Fault Circuit Interrupters

1.3 SUBMITTALS REQUIRED

A. Manufacturer's product data sheets.

B. Circuit breaker schedules.

1.4 MANUFACTURERS

A. Subject to compliance with the specification requirements:

- Square D
- Cutler Hammer
- General Electric
- Siemens

PART TWO: PRODUCTS

2.1 GENERAL

A. Panelboards

Panelboards, including lighting and appliance panelboards and power distribution panelboards, shall be of the sizes, rating and arrangement shown on the drawings.

B. Overcurrent Devices

Panelboards shall be provided complete with all overcurrent devices, accessories and trim.

C. Safety Barriers

All panelboards shall be provided with safety barriers for dead front construction.

D. Short Circuit Ratings

The required short circuit ratings of assembled panelboards are shown on the Drawings. The short circuit rating of every overcurrent device in the panel shall meet or exceed the panel rating. Unless otherwise noted on the Drawings, series rated combinations will not be permitted.

2.2 CABINETS

A. Boxes

Boxes shall be code gauge galvanized sheet steel.

B. Trim

Trim shall be code gauge steel, ANSI-61 gray finish with stainless steel flush type lock/latch handle. All locks shall be keyed alike.

C. Surface Mounted Panels

Trim for surface mounted panels shall be door-in-door construction such that the gutter space may be exposed by a hinged door.

D. Frames

Directory frames shall be metal frame with plastic covers.

2.3 BUS

A. Bus Work

All bus work shall be 750 amp/sq.in. aluminum.

B. Neutral Buses

Unless otherwise noted on the drawings, neutral busses shall be 100% rated with adequate connections for all outgoing neutral conductors.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

C. Panelboards

Panelboards shall be provided with aluminum ground busses.

D. Connection

Bus shall be designed for sequence phase connection to allow the installation of one, two or three pole branch circuit breakers in any position.

2.4 OVERCURRENT DEVICES

A. Device Type

Overcurrent devices shall be trip-free molded case, bolt-on, thermal magnetic circuit breakers.

B. Main Circuit Breakers

Main circuit breakers shall be individually mounted and bolted to bus assembly. Back-fed branch mounted circuit breakers are prohibited.

C. Circuit Breakers Frontfaces

Front faces of all circuit breakers shall be flush. Trip indication shall be clearly shown by the handle position between the ON and OFF positions.

D. Ground Fault Circuit Breakers

Ground fault circuit breakers shall be provided as required on the Contract Drawings and shall require no more panel space than standard breakers.

E. Switching Lighting Circuit Breakers

Where circuit breakers are used for switching of lighting, circuits type "SWD" circuit breakers shall be provided.

F. Connections

All connections shall be rated for 75°C copper conductors.

PART THREE: EXECUTION

3.1 GENERAL

A. Installation

Panelboards shall be installed in accordance with Manufacturer's Instructions. Panelboard mounting heights shall be mounted so the highest breaker switch device does not exceed 48" of the finished floor.

END OF SECTION 26 24 16

SECTION 26 28 16

SAFETY SWITCHES

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Provisions

The provisions of Section 26 05 00, General Requirements for Electrical Work apply to the work of this section.

1.2 APPLICABLE CODES AND STANDARDS

A. Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

NEMA KS-1	Enclosed Switches
UL 98	Enclosed and Deadfront Switches

1.3 SUBMITTALS REQUIRED

A. Manufacturer’s product data sheets.

1.4 MANUFACTURERS

A. Subject to compliance with the specification requirements:

- General Electric
- Square D
- Siemens
- Cutler Hammer

PART TWO: PRODUCTS

2.1 GENERAL

A. Description

Safety switches shall be 240 VAC, NEMA heavy duty, horsepower rated visible blade type. Switches shall be non-fused or fused as indicated on the drawings. Lugs shall be front removable and UL listed for copper conductors. All current carrying parts shall be plated to resist corrosion.

B. Switch Operating Mechanism

The switch operating mechanism shall be spring activated quick make - quick break, such that during the normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening operation of the contacts has been started.

MOUNT DESERT FIRE DEPARTMENT – STATION #1

C. External Operating Handle

The external operating handle shall be an integral part of the box and not the cover. The operating handle shall also indicate the switch position, ON in the up position, OFF in the down position and be capable of being padlocked in the OFF position. An interlock shall be provided to prevent opening the cover when the switch is ON and prevent closing the switch contacts when the cover is opened. This interlock mechanism shall be provided with an externally operated override.

D. Arc Suppressors and Line Terminal Shields

Switches shall be provided with arc suppressors and line terminal shields. Arc suppressors shall be removable if necessary to facilitate access to line side lugs.

E. Number of Switched Poles

Single speed motors shall be provided with three pole switches. Two speed motors shall be provided with six pole switches.

F. Ground Kit

Switches shall be provided with a factory supplied ground kit.

G. Fused Switches

Fused switches shall be provided with class H or K fuses.

H. Short Circuit Rating

The UL Listed short circuit current rating of the switches shall be 10KAIC when used with Class H or K fuses.

I. Enclosures

Safety switches installed indoors shall be provided with NEMA 1 enclosures. Safety switches installed outdoors or in wet areas shall be provided with NEMA 3R enclosures.

PART THREE: EXECUTION

3.1 GENERAL

A. Installation

Safety Switches shall be installed in accordance with Manufacturer's Instructions.

END OF SECTION 26 28 16

SECTION 26 29 13

MOTOR CONTROLLERS

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Provisions

The provisions of Section 26 00 00, General Requirements for Electrical Work apply to the work of this section.

B. The work of this section includes locally installed, enclosed combination magnetic motor starters and manual motor starters.

1.2 APPLICABLE CODES AND STANDARDS

A. Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

NEMA ICS-2	Industrial Control Devices, Controllers and Assemblies.
NEMA ICS-6	Enclosures for Industrial Controls and Systems
UL 508	Industrial Control Equipment.

1.3 SUBMITTALS REQUIRED

A. Manufacturer’s product data sheets.

B. Dimensioned Outline Drawings.

C. Control wiring diagrams.

1.4 MANUFACTURERS

A. Subject to compliance with the specification requirements:

- Square D
- Cutler Hammer
- General Electric
- Siemens

PART TWO: PRODUCTS

2.1 MANUAL MOTOR STARTERS

A. Single Phase Fractional HP Manual Motor Starters

MOUNT DESERT FIRE DEPARTMENT – STATION #1

Single phase fractional HP manual motor starters shall be toggle operated, enclosed, one or two pole switches as required by the installation.

B. Enclosure

The enclosure shall be NEMA 1 for indoor locations and NEMA 3R for outdoor, wet and damp locations. A handle guard shall be provided to allow the toggle operator to be padlocked in the OFF position.

C. Overloads

Starters shall be provided with trip free melting alloy thermal overloads.

PART THREE: EXECUTION

3.1 GENERAL

A. Installation: Equipment shall be installed in accordance with manufacturer's instructions.

B. Overload Heater Elements

The Contractor shall verify motor nameplate amperes and motor service factors and shall provide all overload heater elements and fuses. Overload heater elements shall be sized in accordance with motor nameplate characteristics.

C. Auxiliary Contacts

The Contractor shall verify and provide the proper number of auxiliary contacts required by equipment provided by others, for control and interlocking of equipment specified in other Divisions of this Specification. Coordinate these requirements with Division 15 Controls Contractor.

END OF SECTION 26 29 13

SECTION 26 31 00

FIRE ALARM SYSTEM

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Definition of Work :

This section of the specification includes the furnishing, installation, connection and testing of new fire alarm devices to the existing fire alarm system. Devices shall include, but not be limited to, alarm initiating devices, alarm notification appliances, auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.

1.2 APPLICABLE CODES AND STANDARDS

A. Compliance:

All work shall be in accordance with the laws, rules, codes, and regulations set forth by Local, State, and Federal authorities having jurisdiction. All products and materials shall be manufactured, installed and tested as specified, but not limited to the latest accepted edition of the following codes, standards and regulations:

NFPA 13	Sprinkler Systems
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 101	Life Safety Code
UL 38	Manually Actuated Signaling Boxes
UL 268	Smoke Detectors for Fire Protective Signaling Systems
UL 346	Water-flow Indicators for Fire Protective Signaling Systems
UL 464	Audible Signaling Appliances
UL 521	Heat Detectors for Fire Protective Signaling Systems
UL 864	Control Units for Fire Protective Signaling Systems
UL 1971	Visual Notification Appliances

B. Electrically Supervised System

The fire alarm system shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

C. UL Listing

The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

D. Authority Having Jurisdiction

1. The system and its components shall meet all requirements of the Local Authority Having Jurisdiction.

1.3 SUBMITTALS REQUIRED

A. Shop Drawings

Shop Drawings shall include but not be limited to the following:

- Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
- Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
- Show annunciator layout, configurations, and terminations.

B. Manuals

Manuals shall be submitted simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.

C. Wiring Diagrams

Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.

D. Sequence of Operation

Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

E. Battery Calculation

Provide a complete battery calculation showing that the battery system provided meets the operational requirements as defined by NFPA.

1.4 MANUFACTURERS

- A. Subject to compliance with the requirements of this specification, new devices shall be in compliance with the existing Notifier NFW2-100 system. Coordinate all work with Minuteman Security/Norris Inc., Jim Allmon, (800) 370-3473.

PART TWO: PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. General

New devices shall connect to the existing system. Provide all devices, wiring, conduits, power supplies, programming and commissioning for a complete and operable system.

2.2 SYSTEM CONDUITS, WIRING AND GROUNDING

A. Conduits

Conduits shall be in accordance with other sections of this specification and The National Electrical Code (NEC), local and state requirements.

B. Wiring

Wiring shall be UL listed and in accordance with local, state and national codes and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG for Notification Appliance Circuits. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).

C. Terminal Boxes, Junction Boxes and Cabinets

All boxes and cabinets shall be UL listed for their use and purpose.

D. Arrangement of Circuit Wiring

Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. Grounding of Fire Alarm Control Panel

The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod.

2.3 VISUAL STROBE NOTIFICATION DEVICES

Notification strobes shall be 24V xenon type, meet the requirements of the ADA, UL Standard 1971, and be fully synchronized. Minimum intensity is 15/75cd unless otherwise shown on the Drawings. Manufactured by Notifier, model SGRL

2.4 COMBINATION HORN/STROBE NOTIFICATION DEVICES

Electronic horns shall be 24V, field programmable without the use of special tools, at a sound level of at least 90dBA measured at 10 feet from the device. Strobes shall meet the requirements for Visual Strobe Notification Devices. Manufactured by Notifier, model P2RL

2.5 LOW FREQUENCY MINI HORNS

Electronic low frequency horns shall be 24V, and shall sound within the frequency range of 520Hz +/- 10% square wave tone. Manufactured by Notifier, model HRL-LF

2.6 CARBON MONOXIDE DETECTORS

Carbon monoxide detector shall be system type connected to the fire alarm system, as manufactured by System Sensor, model CO1224

2.7 MANUAL PULL STATIONS

Addressable manual pull stations shall be Notifier model NOT-BG12LX.

2.8 PHOTOELECTRIC AREA SMOKE DETECTORS

Addressable photoelectric smoke detectors shall be Notifier model NP-200 Series devices.

2.9 DUCT SMOKE DETECTORS

Duct smoke detectors shall be a 24 VDC, analog addressable type with integral communications and device identification, and provided with a remote test indicator. Each detector shall be furnished and wired by the electrical contractor and installed by the mechanical contractor in the supply/return air ducts as shown on the Drawings. Duct smoke detectors shall be provided with properly sized air sampling tubes.

A. Operation of Duct Smoke Detectors

Duct smoke detectors shall be provided with 120V rated, form C contacts that open/close upon sensing of smoke or detector failure. Contacts will be used to shut down the associated air handler when detectors are installed in the supply ducts of the air handler.

2.10 HEAT DETECTORS

Addressable heat detectors shall be Notifier model NH-200 Series devices.

2.11 WATERFLOW INDICATORS

Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type, with alarm transmission delay time adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.

A. Installation Requirements

Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor. Where possible, locate waterflow switches a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.

2.12 24-VOLT POWER EXTENDERS

Furnish power supply extenders for the new devices and equipment to be installed. Power supply shall be Notifier model PSE, properly sized for the new devices to be installed contractor shall run 120V to this panel where installed.

PART THREE: EXECUTION

3.01 INSTALLATION

A. Installation Requirements

1. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
2. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
4. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas.
5. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.
6. Smoke detectors shall be provided with dust covers to remain in place during construction

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to protect smoke detectors from contamination and physical damage. Dust covers shall be removed prior to final acceptance.

7. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
8. Manual fire alarm boxes shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.

3.02 TESTING

The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system.

A. Testing Requirements

1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
2. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
3. Verify activation of all waterflow switches.
4. Open initiating device circuits and verify that the trouble signal actuates.
5. Open and short signaling line circuits and verify that the trouble signal actuates.
6. Open and short notification appliance circuits and verify that trouble signal actuates.
7. Ground all circuits and verify response of trouble signals.
8. Check presence and audibility of tone at all alarm notification devices and verify intelligibility and content of voice messages.
9. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.
10. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
11. When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

3.03 FINAL INSPECTION AND CERTIFICATION

At the final inspection, a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect. Upon

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completion of testing submit a certification from the major equipment manufacturer indicating that the supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

3.04 INSTRUCTION

Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

3.05 GUARANTEE

All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

END OF SECTION 26 31 00

SECTION 26 31 15

LIGHTING FIXTURES

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Provisions

The provisions of Section 26 05 00, General Requirements for Electrical Work, and section 26 05 33, Raceway and Fittings, apply to the work of this section.

1.2 APPLICABLE CODES AND STANDARDS

A. Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

CBM Labels	Certified Ballast Manufacturers Assoc.
NEC Art. 410	National Electrical Code
FCC, Part 18	RFI and EMI
ANSI C62.41	Line Transient Protection
UL 924	Emergency Lighting and Power Equipment
UL 1088	Temporary Lighting

1.3 SUBMITTALS REQUIRED

A. Data Sheets, Photometrics and Installation Instructions

Submit manufacturer's product data, photometrics, and installation instructions for each type of light fixture specified. Fixture submittals will be in booklet form with separate sheet for each fixture assembled in "luminaire type" alphabetical order, with proposed fixture and accessories clearly indicated on each sheet.

1.4 MANUFACTURERS

A. General

The fixture types, manufacturers and model numbers are shown on the lighting schedule in the Contract Drawings. These fixtures and manufacturers are listed to establish a baseline type, style and quality of fixture to be provided. Although one manufacturer may be listed on this lighting schedule, other manufacturers' representatives may submit fixtures for consideration as "equal" fixtures to facilitate the "packaging" of the lighting fixtures within the representative's product lines. The architect and engineer however reserve the right to require certain individual fixtures be provided of the model and manufacturer specified in order to meet specific design intent by the architect or engineer.

B. Exterior Fixtures

The Architect and Engineer reserve the right to require that the specified model and manufacturer of some or all of the exterior lighting fixtures be furnished by this contractor, due to approvals of local authorities required prior to Issue of Project Documents. No additional compensation will be furnished to the contractor for "assumptions" that alternate fixtures could be substituted for those specified.

PART TWO: PRODUCTS

2.1 GENERAL

A. Efficiency Maine

The Electrical Contractor shall be responsible for all submissions to Efficiency Maine for the purpose of securing any potential lighting rebates for the Owner. All lighting fixtures shall meet the current Efficiency Maine requirements for rebate and be listed by Design Light Consortium (DLC) or Energy Star for that purpose.

B. Light Fixtures

Light fixtures shall be provided with housings, trims, ballasts, lamp holders, sockets, reflectors, wiring and other components required, as a factory-assembled unit for a complete installation.

C. Electrical Wiring

Provide electrical wiring within light fixtures suitable for connecting to branch circuit wiring in accordance with N.E.C. Article 410, Paragraph 25.

D. Packaging

Deliver interior lighting fixtures shall be delivered in factory fabricated containers and wrapping, in order to properly protect fixtures from damage.

E. Storage

Interior lighting fixtures shall be stored in original packaging. Store inside well-ventilated area protected from weather, moisture, soiling, humidity, extreme temperatures, laid flat and on skids to keep off floors and ground.

F. Ceiling Fixtures

Fixtures installed in ceilings, suspended from ceilings or on walls shall be installed with a plastic film covering protecting the lens, louver and lamps from dust, dirt and debris during construction. Plastic film shall be removed upon the completion of construction.

2.2 LED FIXTURES

A. General

Provide LED fixtures of sizes, types and ratings indicated and specified in the Lighting Fixture Schedule on the Contract Drawings. All assembly combinations shall be listed by DLC or Energy Star, and approvable by Efficiency Maine for rebate purposes.

2.3 LAMPS

A. Lamp Requirements

Provide LED lamps of types as indicated on the contract drawings.

2.4 OCCUPANCY SENSORS

A. General

Occupancy sensors of the type and model specified on the drawings shall be provided, installed and wired into the local lighting circuit in the area that the sensors are installed. The engineer will consider equipment of another equal manufacturer, where suitable coverage can be documented.

B. Passive Infrared Wall-Mount Fixtures

Wall mounted occupancy sensors shall be suitable for dual circuit operation as specified on the contract drawings.

C. Ultrasonic/Infrared Ceiling-Mounted Sensors

Ceiling mounted occupancy sensors shall be self-calibrating type as specified on the contract drawings.

D. Power Packs

Power packs shall be provided as required for each room provided with occupancy sensors as needed.

E. Slave Relay Packs

Slave relay packs shall be provided in rooms with more than one lighting circuit controlled by the occupancy sensor.

F. Installation Requirements

Provide all miscellaneous equipment and wiring for a complete installation.

2.6 LIGHTING CONTROLS

A. General

Operation of exterior lighting is to be provided with a combination of photocell (ON), time clock (ON or OFF), and automatic control override switch (ON) through a UL listed lighting contactor. These controls shall be provided with all components required for a fully-operable system.

B. Lighting Contactors

Lighting contactors shall be provided in a NEMA 1 enclosure sufficiently sized to also house the time clock. Lighting contactors shall be listed for operation with the voltages shown on the Contract Drawings. Lighting contactors shall be multi-pole type sized sufficiently for the number of circuits shown on the contract drawings and a minimum of one spare circuit. Contactors shall be mechanically held with Normally Open (N.O.) contacts which are convertible to Normally Closed (N.C.) type.

C. Photocells

Photocells shall be provided as shown on the Contract Drawings. Mounting location and height shall be as shown on the Drawings and further coordinated with the architect and engineer prior to installation for exact location of box. Photocell shall be provided with NEMA 4 enclosure to be mounted on standard 2"x4" exterior junction box.

PART THREE: EXECUTION

3.1 GENERAL

A. Prior Examination

Examine all areas and conditions under which lighting fixtures are to be installed and structure which will support lighting fixtures. Notify the Contractor in writing of any conditions detrimental to proper installation and completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

B. Coordinate Installation

Coordinate light fixture installations with other trades. Coordinate all lighting fixtures with mechanical piping and ductwork to allow for proper clearance.

3.2 INSTALLATION

A. Locations and Heights

Install all lighting fixtures at locations and heights indicated, in accordance with the architectural reflected ceiling plans.

B. Recessed Lighting Fixtures

All recessed lighting fixtures installed in ceiling which require a fire resistance rating shall be installed in accordance with the International Building Code (IBC).

C. Fastening and Supporting Fixtures

Provide fixtures and/or fixture outlet boxes with hangers, channel or other method of fastening and supporting fixtures required for proper installation.

D. Pendant Mounted Fixtures

All pendant mounted fixtures shall be installed plumb and level or as detailed on the Contract Drawings. Pendant mounted fixtures longer than 18" shall have twin hangers of type specified.

E. Tightening Values

Tighten connectors and terminals, including screws and bolts in accordance with equipment manufacturer's published torque tightening values for equipment connectors. All screws and bolts shall have washers.

3.3 SPLICES AND TERMINATIONS

A. General

Twist on wire connectors shall be installed which utilize square-wire spring grips and thermo plastic shells. Install connectors to meet the manufacturer's torquing requirements. Install wire connectors of size required as not to exceed the manufacturers UL-listed CSA recognized wire combinations

3.4 FIELD QUALITY CONTROL

A. Replacement of Lamps

At date of substantial completion, all lamps that are not functioning, have color deficiencies, or are noticeably dimmed shall be replaced with new lamps as determined by the Engineer.

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B. Cleaning Light Fixtures

All light fixtures shall be cleaned of dirt and debris upon completion of construction. All fingerprints and smudges shall be cleaned.

C. Protection During Construction

All installed fixtures during remainder of construction shall be protected in accordance with section 2.1.5 of this specification section.

D. Grounded

All light fixtures shall be grounded in accordance with article 250 and 410 of the NEC. Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounds.

E. Damaged Light Fixtures

All light fixtures damaged in shipping or during installation shall be replaced with new fixtures at no cost to the owner.

END OF SECTION 26 31 15

SECTION 26 43 13

TRANSIENT VOLTAGE SURGE SUPPRESSION

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Provisions

The provisions of Section 26 05 00, General Requirements for Electrical Work apply to the work of this section.

1.1.2 Equipment

This section describes the materials and installation requirements for surge protection devices for the protection of AC electrical circuits from the effects of lightning induced currents, substation switching transients and internally generated transients resulting from inductive and/or capacitive load switching.

1.2 APPLICABLE CODES AND STANDARDS

1.2.1 Products

Products shall comply with the following codes and standards and shall be UL-listed and labeled:

NFPA 70	National Electrical Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
UL 1283	Standard for Electromagnetic Interference Filters
UL 1449	Transient Voltage Surge Suppression
ANSI/IEEE C62.41	8x20 Single Impulse Current Test

1.3 SUBMITTALS REQUIRED

1.3.1 Data Sheets and Drawings

Manufacturer's product data sheets, shop drawings and system layout drawings shall be submitted for approval prior to installation. Layout drawings shall include locations of all devices and required connections. Product data shall include manufacturer's written recommendations for installation.

1.4 MANUFACTURERS

Subject to compliance with the specification requirements:

- Square D
- Cutler Hammer
- General Electric
- Siemens

PART TWO: PRODUCTS

2.1 GENERAL

2.1.1 Mounted Assembly

TVSS modules may be provided remote mounted or integral to the panelboard the device is directly protecting. However, if the manufacturer, supplier or contractor decides to provide this as a remote mounted assembly, all components including but not limited to breakers, wiring, and conduit required by this installation shall be provided by the contractor at no additional cost to the owner. Remote mounted assembly shall be provided in a NEMA 1 enclosure or as indicated by the drawings.

2.1.2 UL Listed

TVSS system shall be UL Listed.

2.1.3 Service Entrance

Service entrance TVSS system shall be suitable for use in service entrance locations.

2.1.4 Materials of Construction

TVSS shall be Metal Oxide Varistor (MOV) based, however, silicon avalanche diode (SAD) and combination MOV and SAD systems will be considered if submitted.

2.1.5 Protection

TVSS protection shall be for all modes of protection, Line-to-Line/Line-to-Neutral, Line-to-Ground, and Ground-to-Neutral. The maximum surge current capability shall be at least 160kA for the service entrance TVSS unit and 120kA for the panel mounted TVSS unit feeding the communications equipment. Maximum surge capability shall be measured as the sum of the Line-to-Neutral value plus the Line-to-Ground value.

2.1.6 Suppression Voltage Ratings

The UL component suppression voltage ratings shall not exceed the following:

Voltage	Line-to-Neutral	Line-to-Ground	Neutral-to-Ground	Line-to-Line
208Y/120V	400V	400V	400V	700V

2.1.7 Let Through Voltages

The ANSI/IEEE C62.41 (1991) Category C3 let through voltages shall not exceed the following:

Voltage	Line-to-Neutral	Line-to-Ground	Neutral-to-Ground
208Y/120V	520V	520V	520V

2.1.8 Protection

Unit shall be capable of protecting against and surviving 5000 ANSI/IEEE C62.41 Category C transients without failure.

2.1.9 Operating Voltage

Each TVSS shall be designed to withstand a maximum continuous operating voltage (MCOV) of not less than 115% of nominal RMS voltage.

2.1.10 Monitoring

TVSS shall be provided with onboard visual and audible diagnostic monitoring. Indicator lights/LED's shall provide fulltime visual diagnostic monitoring of the operational status of each phase of the surge current diversion module and shall differentiate full operation, reduced system operation and system failure. An audible alarm shall be provided to indicate a fault condition.

PART THREE: EXECUTION

3.1 GENERAL

3.1.1 Installation

Equipment shall be installed in accordance with manufacturer's instructions.

3.1.2 Mounting

Remote mounted TVSS units shall be mounted as close to the electrical panel they are fed from as possible and shall use short, straight wiring runs with minimum slack, no extra turns and no loops to minimize circuit inductance and shall not exceed manufacturer's recommended maximum distance of installation.

3.1.3 Warranty

TVSS shall be provided with a five-year warranty.

END OF SECTION 26 43 13

SECTION 26 51 00

TELEPHONE, DATA, INTERCOM AND RADIO SYSTEMS

PART ONE: GENERAL

1.1 GENERAL REQUIREMENTS

A. Provisions for Telephone/Data

The provisions of Section 26 05 00, General Requirements for Electrical Work apply to the work of this section. The intent of this document is to provide a standard specification that will be used for providing voice and data wiring, raceways and devices boxes, within the new spaces and areas identified within the existing building. Wire termination and equipment to be furnished by others.

B. Provisions for Intercom & Radio Systems

The provisions of Section 26 05 00, General Requirements for Electrical Work apply to the work of this section. The intent of this document is to provide a standard specification that will be used for providing intercom system wiring, raceways and devices boxes, within the new spaces and areas identified within the existing building. Wire termination and equipment to be furnished by others.

PART TWO: PRODUCTS

2.1 CONDUITS

See Section 26 05 33, Electrical Raceways for conduit and raceway requirements.

2.2 DATA CABLING

- A. Data Cabling: Shall be Category 6, conduits shall be sized based upon this assumption.
- B. All cabling to be furnished and installed by this contractor and run from the wall box back to the data room with sufficient slack left in this room to reach the floor below the equipment rack. Jacks, punch-down blocks and termination of wire shall be by others.
- C. Coordinate any work on this system with Owners' Tel/Data System Consultant, Robert Bickmore.

2.3 INTERCOM WIRING

- A. Intercom/PA system wiring shall be 2 conductor #22 AWG, twisted, shielded, CMR rated, low capacitance, flat frequency response type, as manufactured by West Penn, model 452, or equal.
- B. Cables are to be run such that the speakers (furnished by others) are to be daisy-chained, provide a minimum of 18" of slack cable in each box.
- C. Intercom/PA system wires shall be run back to the PA system in the day watch room, southwest corner. Provide enough cable to reach the floor. Speakers, head end equipment, and terminations to be furnished by others.
- D. Coordinate any work on this system with Owners' Radio Consultant, Brown Communications, Jim Cormier, (207) 667-2254.

PART THREE: EXECUTION

3.1 GENERAL

- A. See Section 26 05 00, General Requirements for Electrical Work for wiring installation requirements.
- B. All wiring shall be neatly labelled at both ends to clearly designate where they originate.
- C. When not in conduit or cable tray install in J-Hooks designed explicitly for communications cabling. Bridle rings, cable ties, mechanical, and structural steel are not acceptable means of supporting communications cables.
- D. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- E. Comply with TIA/EIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.
- F. All telephone and data location locations shall be furnished with EMT (minimum 3/4") conduits in walls and inaccessible locations.

END OF SECTION 26 51 00

SECTION 26 60 00

DIESEL GENERATOR AND AUTOMATIC TRANSFER SWITCH

PART ONE – GENERAL

1.01 General Requirements

A. Work in Other Sections

Provisions of Section 26 00 00 General Requirements for Electrical Work apply to the work of this Section.

B. Requirements:

This specification covers requirements for providing, installing, and acceptance testing for a complete and operational diesel engine-driven standby power supply and automatic transfer switch for normal standby power.

The generator shall include a complete control system for automatic start including but not limited to cranking controls, cool down and exercising.

The generator manufacturer shall provide all unit mounted and field installed accessories including, but not limited to, silencer, starting batteries, static battery charger, generator main breakers, engine cooling system with coolant, fuel tank, weatherproof enclosure and vibration isolators.

This equipment, including the engine-generator set shall be manufactured by a single manufacturer who has been regularly engaged in the production of engine-generator sets for a minimum of ten years. The electric generating system described herein, including these components shall be factory built, factory tested, and shipped by this single manufacturer, so there is one source of supply and responsibility for warranty, parts, and service. This manufacturer shall have a local representative who can provide factory-trained servicemen, required stock of replacement parts, and technical assistance.

1.02 Manufacturers

The equipment shown is based on equipment as manufactured by Onan Corporation, Minneapolis, Minnesota. Other manufacturers such as Caterpillar, Generac and Kohler will be considered however sizing calculations must be provided with the submittal to meet the generator starting and run load requirements of the facility.

All products specified under this section shall be warranted by the manufacturer or a factory authorized dealer unconditionally for a period of one year from the date of acceptance by the owner. Warranty shall include total service 24 hours per day, 7 days per week, with a 4 hour response time. All costs incurred including labor, materials, travel, and other expenses are to be covered under this warranty.

1.03 Submittals

- Manufacturers data and catalog cuts on the engine, generator set, silencer, vibration isolators, static battery charger, starting batteries, generator main breaker, engine governor and automatic transfer switches.
- Dimensioned outline drawings indicating weights, components, accessories, and field connections.
- Electrical drawings including schematic and connection diagrams showing terminal block identification and arrangement, field and unit wiring.

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- Summary test reports for prototype tests and certified reports for production tests.
- Generator capability curve.
- Delivery schedule.
- Statement of warranty.
- Generator reactance and short circuit data.
- Exhaust chemistry detail.
- Sound levels.
- Prior to final acceptance, operators and spare parts manuals shall be provided for all system equipment. The manuals shall include outline, interconnection, wiring, and control drawings accurately describing the equipment provided. Provide ladder logic for all programmable logic controllers in the system.

PART TWO – SCOPE OF WORK

2.01 Diesel Engine Generator Set

- A. 4-cycle, 1800 RPM, diesel engine generator set. Generator set ratings: 125KW/156KVA at 0.8 PF, based on site conditions noted below. System voltage of: 208Y/120Volts AC, Three phase, Four-wire, 60 hertz.
- B. Voltage regulation shall be plus or minus 0.5 percent for any constant load between no load and rated load. Random voltage variation with any steady load from no load to full load shall not exceed plus or minus 0.5 percent.
- C. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25%.
- D. The diesel engine-generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.

2.02 Engine

- A. The engine shall be diesel, 4 cycle, radiator and fan cooled. Minimum displacement shall be 408 cubic inches, with 6-cylinders. The horsepower rating of the engine at its minimum tolerance level shall be sufficient to drive the alternator and all connected accessories. Two cycle engines are not acceptable. Engine accessories and features shall include:
 - B. An electronic governor system shall provide automatic isochronous frequency regulation.
 - C. Skid-mounted radiator and cooling system rated for full load operation in 122 degrees F (50 degrees C) ambient as measured at the generator air inlet. Radiator shall be provided with a duct adapter flange. The cooling system shall be filled with 50/50 ethylene glycol/water mixture by the equipment supplier. Rotating parts shall be guarded against accidental contact per OSHA requirements.
 - D. An electric starter(s) capable of three complete cranking cycles without overheating.
 - E. Positive displacement, mechanical, full pressure, lubrication oil pump.
 - F. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.

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- G. An engine driven, mechanical, positive displacement fuel pump. Fuel filter with replaceable spin-on canister element.
- H. Replaceable dry element air cleaner with restriction indicator.
- I. Flexible supply and return fuel lines.
- J. Engine mounted battery charging alternator, 45 ampere minimum, and solid-state voltage regulator.

2.3 AC Generator

- A. The AC generator shall be synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single pre-lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 125°C.
- B. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.
- C. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds

2.4 Engine Generator Controls

- A. The generator set shall be provided with a microprocessor-based control system which is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification.
- B. The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.
- C. The control shall be UL508 listed, CSA282-M1989 certified, and meet IEC8528 part 4. All switches, lamps and meters shall be oil-tight and dust-tight, and the enclosure door shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts. The controls shall meet or exceed the requirements of Mil-Std 461C part 9, and IEC Std 801.2, 801.3., and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions. The entire control shall be tested and meet the requirements of IEEE587 for voltage surge resistance.
- D. The generator set mounted control shall include the following features and functions:
 - 1. Three position control switch labeled RUN/OFF/AUTO. In the RUN position the generator set shall automatically start, and accelerate to rated speed and voltage. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
 - 2. Red "mushroom-head" push-button EMERGENCY STOP switch. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.

3. Push-button RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.
4. Push-button PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.

E. Generator Set AC Output Metering: The generator set shall be provided with a metering set including the following features and functions:

1. Digital metering set, 0.5% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three phase voltages (line to neutral or line to line) simultaneously.

2.5 Generator Set Alarms and Status Message Display

A. The generator set shall be provided with alarm and status indicating lamps to indicate non-automatic generator status, and existing alarm and shutdown conditions. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. The generator set control shall indicate the existence of the following alarm and shutdown conditions on a digital display panel:

1. low oil pressure (alarm)
2. low oil pressure (shutdown)
3. oil pressure sender failure (alarm)
4. low coolant temperature (alarm)
5. high coolant temperature (alarm)
6. high coolant temperature (shutdown)
7. engine temperature sender failure (alarm)
8. low coolant level (alarm or shutdown--selectable)
9. fail to crank (shutdown)
10. overcrank (shutdown)
11. overspeed (shutdown)
12. low DC voltage (alarm)
13. high DC voltage (alarm)
14. weak battery (alarm)
15. low fuel-daytank (alarm)
16. high AC voltage (shutdown)
17. low AC voltage (shutdown)
18. under frequency (shutdown)
19. over current (warning)
20. over current (shutdown)
21. short circuit (shutdown)
22. ground fault (alarm)(optional--when required by code or specified)
23. over load (alarm)
24. emergency stop (shutdown)

B. In addition, provisions shall be made for indication of two customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above specified conditions. The non-automatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

2.6 Engine Status Monitoring

- A. The following information shall be available from a digital status panel on the generator set control :
 1. Engine oil pressure (psi or kPA)
 2. Engine coolant temperature (degrees F or C)
 3. Engine oil temperature (degrees F or C)
 4. Engine speed (rpm)
 5. Number of hours of operation (hours)
 6. Number of start attempts
 7. Battery voltage (DC volts)

- B. The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.

2.7 Control Functions

- A. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15 second rest period between cranking periods.

- B. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.

- C. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting. The governor control shall be suitable for use in paralleling applications without component changes.

- D. The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.

- E. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.

2.8 Alternator Control Functions

- A. The generator set shall include an automatic voltage regulation system which is matched and prototype tested with the governing system provided. It shall be immune from misoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three-phase RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below a threshold of [58-59] HZ. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alpha-numeric LED readout to indicate setting level. The voltage regulation system shall include provisions for reactive load sharing and electronic voltage matching for paralleling applications. Motorized voltage adjust pot is not acceptable for voltage matching.

- B. Controls shall be provided to monitor the output current of the generator set and initiate an alarm when load current exceeds 110% of the rated current of the generator set on any phase for more

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than 60 seconds. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator.

- C. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition when total load on the generator set exceeds the generator set rating for in excess of 5 seconds.
- D. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.
- E. An AC over/under voltage monitoring system which responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds.
- F. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 25VDC or more than 32 VDC. During engine starting, the low voltage limit shall be disabled, and if DC voltage drops to less than 14.4 volts for more than two seconds a "weak battery" alarm shall be initiated.

2.9 Control Interfaces for Remote Monitoring

- A. All control and interconnection points from the generator set to remote components shall be brought to a separate connection box. No field connections shall be made in the control enclosure or in the AC power output enclosure. Provide the following features in the control system:
 - B. Form "C" dry common alarm contact set rated 2A @ 30VDC to indicate existence of any alarm or shutdown condition on the generator set.
 - C. One set of contacts rated 2A @ 30VDC to indicate generator set is ready to load. The contacts shall operate when voltage and frequency are greater than 90% of rated condition.
 - D. A fused 10 amp switched 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.
 - E. A fused 20 amp 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.

2.10 Base

- A. The engine-generator set shall be mounted on a heavy duty, steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails.

2.11 Coolant Heater

- A. Coolant heater shall be engine mounted, thermostatically controlled, coolant heater for each engine. Heater voltage shall be as 120V.
- B. The coolant heater shall be installed on the engine with silicone hose connections. Steel tubing shall be used for connections into the engine coolant system where ever the length of pipe run exceeds 12 inches. The coolant heater installation shall be specifically designed to provide proper venting of the system. The coolant heaters shall be installed using quick disconnect couplers to isolate the heater for replacement of the heater element. The quick

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disconnect/automatic sealing couplers shall allow the heater element to be replaced without draining the engine cooling system or significant coolant loss.

C. The coolant heater shall be provided with a 24VDC thermostat, installed at the engine thermostat housing. An AC power connection box shall be provided for a single AC power connection to the coolant heater system.

D. The coolant heater(s) shall be sized as recommended by the engine manufacturer to warm the engine to a minimum of 100F (40C) in a 40F ambient, in compliance with NFPA110 requirements.

2.12 Exhaust Silencers and associated piping

A. Exhaust muffler shall be provided for each engine, size and type as recommended by the generator set manufacturer. The mufflers shall be critical grade. Exhaust system shall adapt to existing system and be installed according to the generator set manufacturers recommendations and applicable codes and standards.

2.13 Starting and Control Batteries

A. Starting battery bank, calcium/lead antimony type, 24 volt DC, sized as recommended by the generator set manufacturer, shall be supplied for each generator set with battery cables and connectors.

2.14 Battery Charger

A. A UL listed/CSA certified 10 amp voltage regulated battery charger shall be provided for each engine-generator set. The charger may be located in the generator enclosure. Input AC voltage and DC output voltage shall be as required. Chargers shall be equipped with float, taper and equalize charge settings. Operational monitors shall provide visual output along with individual form C contacts rated at 4 amps, 120 VAC, 30VDC for remote indication of:

1. Loss of AC power - red light
2. Low battery voltage - red light
3. High battery voltage - red light
4. Power ON - green light (no relay contact)
5. Analog DC voltmeter and ammeter, 12 hour equalize charge timer, AC and DC fuses shall also be provided on the charger.

2.15 Fuel Tanks

A. The engine-generator unit shall be furnished with 260 gallon skid mounted dual wall sub base fuel tank. The tank shall be mounted such that an air space is provided between the bottom of the tank and the foundation underneath.

2.16 Outdoor Weather Protective/Sound Attenuated Level 2 Enclosure

Generator set housing shall be constructed of aluminum and provided factory-assembled to generator set base and radiator cowling. Housing shall provide ample airflow for generator set operation at rated load in the ambient conditions previously specified. The housing shall have hinged side-access doors and rear control door. All doors shall be lockable. Housing shall be primed for corrosion protection and finish painted with the manufacturer's standard color using a two-step electro-coating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work. Shall be furnished with Level 2 Sound Attenuation for installation in a residential area.

2.17 AUTOMATIC TRANSFER SWITCH

- A. The ATS shall be shall be 400A, 120/208-volt, 3-pole. Enclosures shall be rated NEMA 1.
- B. ATS unit shall be furnished with fully rated, silver plated copper ground and neutral bus.
- C. ATS unit shall be furnished with break-before-make action and mechanical interlocks to prevent simultaneous closing of normal and standby contacts.
- D. ATS unit shall be furnished with two (2) contacts rated at 5A continuous at 100VAC for customer use.
- E. An exerciser timer with momentary test pushbutton shall be incorporated within the microprocessor and shall be capable of starting the engine generator set and transferring the load (when selected) for exercise purposes on a daily, weekly or monthly basis. The exerciser shall contain a battery for memory retention during an outage.

PART THREE: EXECUTION

3.1 Installation

- A. Install the diesel engine-driven generator unit as indicated, in accordance with the equipment manufacturer's written instructions, and with recognized industry practices, to ensure that the engine-generator unit will fulfill requirements. Comply with NFPA and NEMA standards pertaining to installation of engine-generator sets and accessories.
- B. Coordinate with other work, including raceways, electrical boxes and fittings, fuel tanks, piping and accessories, as necessary to interface installation of engine-generator equipment work with other work.
- C. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A, B and the National Electrical Code.
- D. Provide all interconnecting wiring and branch circuits for field mounted accessories.
- E. Provide engine coolant with conditioner as recommend by the manufacturer.
- F. Verification that existing exhaust stack is adequate for new generator exhaust prior to disconnecting the existing generator. Furnish all parts and equipment for connection to this ductwork.

3.2 Grounding

- A. Intent is that the generator will be connected to the building grounding system as currently installed. Furnish all grounding wiring, equipment and materials for a complete installation.

3.3 Testing

- A. Contractor shall engage local equipment manufacturer's representative to perform start-up and building load tests upon completion of installation.
 - 1. Prototype test: The following tests and all testing required by NFPA 110, Par 3-2.1 shall be performed on a prototype of the generator set being provided:
 - Torsional test and analysis.

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- Generator temperature rise test by embedded detector and resistance method.
 - Short circuit test with generator set operating at rated load and speed.
 - Endurance test of minimum five hundred (500) continuous hours.
 - Linear vibration test.
 - Cooling systems test at rated output and maximum ambient temperature.
 - Maximum motor starting kVA.
2. The following production tests shall be performed on each unit and certified test reports submitted prior to shipment:
- Voltage regulation
 - Frequency regulation
 - Transient response
 - Rated output of 0.8 power factor
 - Fuel consumption.
- 3.4 Building Operating Personnel Training**
- A. Provide on-site training for Owner's building personnel in procedures for starting up testing, and operating, and maintaining the Back-up Power System.
- 3.5 Warranty**
- A. Provide 5-year comprehensive warranty for the generator system and auxiliary components.

END OF SECTION 26 60 00

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Scope: Clearing includes, but is not limited to, removal of trees, brush, stumps, grass, poles, posts, signs, fences, culverts and all necessary vegetation and minor structures (including catch basins, piping, electrical conduits and equipment and other miscellaneous utilities being abandoned or removed for the project)
- B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- D. Notify utility locator service for area where Project is located before site clearing.
- E. Clearing work performed for the convenience of the Contractor shall not be considered for payment. Areas cleared without previous approval by the Owner shall have vegetation, structures and other items removed, re-established to the satisfaction of the Owner.
- F. All material and structures shall be removed and disposed of in accordance with all applicable local, State and Federal ordinances, laws, and code requirements.
- G. Do not begin site-clearing operations until temporary erosion and sedimentation control measures are in place.
- H. Stumps, brush and vegetative matter shall be ground up and spread as mulch on site. **Stumps are not to be buried or hauled off.**
- I. Contractor shall be responsible for layout of the clearing area.

PART 2 - PRODUCTS

- A. Provide all materials required to complete the work.
- B. All timber and wood shall become the property of the Contractor unless other arrangements have been made between the Owner and the Contractor.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clearing shall only be performed within areas so designated on the plans, as required for construction, or as directed by the Engineer.

- B. Protect and maintain benchmarks and survey control points from disturbance.
- C. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to; the requirements of authorities having jurisdiction, the sediment and erosion control Drawings, details and specifications provided, and/or the approved sediment and erosion control plan, whichever is more stringent.
- D. Protect site improvements to remain from damage. Restore damaged improvements to condition existing before start of site clearing.
- E. Locate and clearly flag trees and vegetation to remain or to be relocated.
- F. Protect remaining trees and shrubs from damage and maintain vegetation. Employ skilled workmen and/or an arborist to repair tree and shrub damage. Restore damaged vegetation. Replace damaged trees that cannot be restored to full growth, as determined by arborist.
- G. Do not store materials or equipment or permit excavation within drip line of remaining trees.
- H. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.

3.2 SITE CLEARING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots. Stumps, roots and slash shall be ground up and used for erosion control on site. Stumps shall not be buried on or off site.
- B. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- C. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Neatly saw-cut length of existing pavement to remain before removing existing pavement.
- D. In areas not to be further excavated, fill depressions resulting from site clearing. Place and compact satisfactory soil materials in 8-inch- thick layers to density of surrounding original ground.
- E. Dispose of waste materials, including trash, debris off Owner's property at an approved location.
 - 1. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

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F. Burning:

1. Dispose of combustible materials by burning only if approved by the local and State officials.
2. Do not leave fires unguarded.
3. Do not burn poison oak, poison ivy or other plants of similar nature.
4. Do not use tires or other combustible waste material to augment burning.
5. The Contractor shall be responsible for obtaining all necessary permits for burning.

END OF SECTION 31 10 00

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SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Trench & structure excavation in earth and ledge.
- B. Grubbing, stripping and stockpiling of topsoil.
- C. All excavation and earthwork required for site work and sub-grade preparation.
- D. Backfilling of structures, trenches, facilities, and excavations.
- E. Preparation of subgrades, backfill and bedding materials.
- F. Rip-rap placement.

1.2 GENERAL REQUIREMENTS

- A. Section refers to Maine Department of Transportation Standard Specifications (MDOTSS) latest edition.
- B. Unit prices for rock excavation are included in Payment Procedures or are considered incidental to the contract.
- C. Unauthorized excavation consists of excavation below that required under the contract or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- D. Notify utility locator service for area where Project is located before site clearing.
- E. All timber and wood shall become the property of the Contractor unless other arrangements have been made between the Owner and the Contractor.
- F. Strip all topsoil from within construction limit lines and stockpile in areas approved by Engineer. Surplus topsoil, gravel or suitable backfill material shall not be removed from the site unless/until approval is received from the Engineer. This shall not relieve the Contractor of his responsibility to remove unsuitable material or excess suitable material from the site when so directed by the Engineer. Owner shall retain ownership of excess (not re-used on site) topsoil. Other excess material on the site shall become the property of the Contractor.
- G. Do not interrupt existing utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
- H. Rip-rap shall include furnishing all labor, equipment, and materials and performing all work necessary to place a protective covering of erosion-resistant material on the slopes of

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embankments, culvert inlets and outlets, and stream-banks. The work shall be in conformity with the lines and grades shown on the plans.

- I. Perform all de-watering necessary to maintain excavated areas free from water from any source.
- J. All work shall be performed and completed in conformance with all applicable local, State & Federal requirements. Specifically, permits obtained by the Owner and including requirements for construction are incorporated into these specifications and shall be implemented by the Contractor.
- K. Do not begin site-clearing operations until temporary erosion and sedimentation control measures are in place. Temporary erosion and sedimentation control measures shall be maintained until the site is permanently stabilized with regard to erosion, at which point the Contractor shall remove them.

1.3 SALVAGE OF NATIVE STONE

- A. All blasted ledge and all native stones with dimensions of 12"x12" or larger shall be removed from the site and disposed of by the Contractor.

1.4 SURVEYING AND LAYOUT

- A. The Contractor shall employ, within the contract price, a competent survey foreman to: verify all locations, lines, grades, property lines, work lines and provide layout as required to complete the work according to the Drawings and Specifications.
- B. The Drawings indicate, in general, the alignment and grades of the work. The Engineer, however, may require the Contractor to make adjustments in grades and alignment as necessary during the performance of the work. Grading between indicated final grades shall be smooth, even surfaces, except as otherwise required.
- C. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same by means of suitable stakes or battens to properly perform the contract installation.
- D. Protect and maintain benchmarks and survey control points from disturbance.

1.5 DISPOSITION OF UTILITIES

- A. The locations of utilities shown on the plan are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warrants that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities within the project area.
- B. Rules and regulations governing the respective utilities shall be observed in executing all work in this Section. Active utilities shall be adequately protected from damage and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped. Such abandoned utilities shall be noted on the record drawings. Extreme care shall be taken when performing

work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable. If, in the progress of excavation, any utility should become damaged and result in any damage to public or private property, the General Contractor shall restore to the original condition, at no additional cost to the Owner, anything which has been damaged or disturbed.

- C. Follow all regulations and requirements of the governing utility authority (i.e., water district, electric company, municipal public works, state agency, etc.) whenever utilities are encountered during the work on this project.

1.6 QUALITY ASSURANCE

- A. Regulatory agencies, codes & standards

All work shall be performed in accordance with all applicable local, State or federal regulations and requirements, including Occupational Safety standards. The Owner shall secure required permits for the work. Contractor shall provide submittals for all erosion control mats, both temporary and permanent as well as other materials or equipment specified in these specifications.

- B. Soil testing and inspection

Contractor shall provide soil testing and quality control testing during earthwork operations from an independent testing entity acceptable to both the Owner and the Contractor. The cost of soil testing shall be covered by Allowance as described in the contract documents. Contractor shall obtain and submit to the Engineer the test results for every soil proposed to meet specified material or to be used within the project, prior to such material being used on the project. These tests shall include:

- a. Optimum moisture-density curve as determined by ASTM D1557 (modified proctor)
- b. Sieve analysis as determined by ASTM C-117 & C-136

1.7 SUBMITTALS

- A. Comply with Submittal section of these specifications regarding process and quantity of submittals.
- B. Submittals shall be prepared for items including, but not limited to:
 - 1. Soil gradations
 - 2. Soil density tests (modified proctors)
 - 3. Geotextile fabrics
 - 4. Erosion control fabrics, fences, inlet protection devices

1.8 EXCAVATION PROTECTION

- A. Provide shoring, sheeting, bracing and protection at all excavations as required to prevent cave-ins of excavation and to assure complete safety of existing structures, utilities and pavements that are to remain in place.

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- B. Comply with all local, State and/or Federal safety regulations as well as good construction practice.
- C. Completely fill with suitable material and thoroughly compact all voids left by the removal of sheeting. Where sheeting is to be left in place, obtain written permission from the Engineer to do so.

1.9 PROTECTION OF PERSONS AND PROPERTY

- A. The Contractor shall be responsible to ensure that all persons and property are adequately protected. Open excavations shall be barricaded and posted with warning lights from dusk to dawn and as otherwise required by the Engineer. The public, structures, utilities, traffic, sidewalks, pavements, and other facilities shall be protected from damage caused by settlement, lateral movement, undermining, washout and any other hazard created by the earthwork operations. Protect all existing trees, shrubs and plantings. Tree trunks shall be protected by substantial boxing to prevent damage.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 6 inches in any dimension, debris, waste, frozen materials, vegetation, or other deleterious matter.
- B. Unsatisfactory Soil: ASTM D 2487 Soil Classification Groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Sub-base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; MDOT 703.6 (c) Type D; with the following gradation:

<u>Sieve Designation</u>	<u>% by Weight Passing Square Mesh Sieves</u>
½”	35-80
¼”	25 – 65
No. 40	0 – 30
No. 200	0 – 7.0

Aggregate for subbase shall not contain particles of rock which will not pass the 6 in. square mesh sieve.

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- D. Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; MDOT 703.06(a) Type B meeting the following gradation:

<u>Sieve Designation</u>	<u>% by Weight Passing Square Mesh Sieves</u>
½”	35 - 75
¼”	25 - 60
No. 40	0 - 25
No. 200	0 – 6.0

Aggregate for base shall not contain particles of rock which will not pass the 2 in. square mesh sieve. (This is modified from standard MDOT spec)

- E. Structural Fill: Well-graded sand and gravel mixture meeting the following requirements:

<u>Sieve Designation</u>	<u>% by Weight Passing Square Mesh Sieves</u>
4”	100
3”	90 - 100
¼”	25 – 90
No. 40	0 – 30
No. 200	0 – 5.0

- F. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; MDOT 703.22, Type B underdrain material meeting the following gradation:

<u>Sieve Designation</u>	<u>% by Weight Passing Square Mesh Sieves</u>
1”	95-100
½”	75 - 100
No. 4	50-100
No. 20	15-80
No. 50	0-15
No. 200	0-5.0

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- G. Underdrain Backfill Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; MDOT 703.22, Granular Material for Type B underdrain meeting the following gradation:

<u>Sieve Designation</u>	<u>% by Weight Passing Square Mesh Sieves</u>
1"	95 – 100
1/2"	75 – 100
No. 4	50 – 100
No. 20	15 – 80
No. 50	0 – 15
No. 200	0 – 5.0

- H. Crushed Stone, unwashed: Narrowly graded mixture of unwashed crushed stone, suitably graded from 1/8" to 3/4" in size. Mixture shall have some fines to help prevent water flow along the installed pipe lines.
- I. Crushed Stone, washed: crushed, screened and washed durable stone of a consistent 3/4" in size, unless otherwise noted on the plans or in the specifications.
- J. Sand: Course to fine sand aggregate shall be of hard, durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances and meeting the requirements of MDOT 703.05.
- K. Rip-Rap: Stone as designated on the drawings and meeting the requirements of the referenced portion of MDOT Standard Specifications. Rip-Rap shall meet the requirements of sections 703.26 to 703.28 as specified on the drawings.
- A. Geotechnical Fabric (woven): Fabric shall be as called for on the plans as governed by MDOT section 722.04. Material shall be Class 1. Basis of Design: Mirafi 600x
- B. Geotextile Fabric (non-woven): At drains or other locations where non-woven fabric is called for on the plans, or in these specifications, the fabric used shall comply with MDOT 722.02, Class 2. Basis of Design: Mirafi 160N.

PART 3 - EXECUTION

3.1 SOILS APPLICATIONS

- A. The soils listed in Part 2 shall be used in the following areas unless otherwise noted on the plans or modified herein:

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<u>Application</u>	<u>Soil Material to be used</u>
HDPE piping smaller than 4" (1 foot around pipe)	Sand
HDPE piping 4" and larger bedding & initial fill	Bedding
Final Trench Backfill to subgrade elevation	Material taken from trench shall be re-used or Satisfactory Soil
Under utility structures	Crushed Stone, washed
PVC Pipe bedding and initial fill	Bedding
Culvert bedding and embedment	Bedding
Copper and HDPE water services (1 foot around pipe)	Sand
Trench Backfill under roads/paths to subgrade elevation (other than DI pressure pipe)	Satisfactory Soil
Trench Backfill not under roads/paths (Final Backfill)	Satisfactory Soil
Road Subbase	Subbase Material
Road Base	Base Material
Backing of pavement edge for shoulders	Pavement Backing/Shoulder material
Backfill at foundations, piers & posts	Subbase Material (4" minus)
12" directly under slab-on-grade and under foundations	Structural Fill or Base Material
Drains	Washed, crushed stone (3/4")
Locations Calling for Crushed Stone	Washed unless specifically noted otherwise

3.2 EARTHWORK

- A. Protect and maintain erosion and sedimentation controls, which are specified and as specified on the plans, during earthwork operations.
- B. Protect subgrades and foundation soils from softening and damage by water, freezing temperatures, or frost.
- C. Embankments and sub-grade shall be built and prepared according to MDOT Standard Specifications Sections 203.10, 203.11, 203.16 & 203.17. Any soft spots discovered during rolling and/or compaction shall be excavated, removed and replaced with satisfactory material.
- D. Stockpile satisfactory excavated materials and materials supplied for the project where directed until required. Place, grade, and shape stockpiles for drainage and protect from erosion if they will be left more than 10 days.
- E. Excavate for structures, pavements, and walkways. Trim subgrades to required lines and grades. Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock.
 - 1. Unauthorized Excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without direction of the Engineer. Unauthorized excavation as well as remedial work directed by the Engineer shall be done at the Contractor's expense. Unauthorized excavations shall be backfilled and compacted as specified for authorized excavations of the same classification unless otherwise directed by the Engineer.
 - 2. Additional Excavation: If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Engineer.
- F. Utility Trenches: Remove the top 4" of material from trench location and set it aside to be used to finish top of trench area (except at paved areas). Excavate trenches to indicated slopes, lines, depths, and invert elevations. Maintain 12 inches of working clearance on each side of pipe or conduit.
 - 1. Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
 - 2. Place and compact initial backfill of specified material, free of particles larger than 1 inch, to a height as detailed over the utility pipe or conduit. Place and compact final backfill, utilizing material removed from the trench to final subgrade.
 - 3. Replace top 4" of trench excavation with salvaged material equaling Shoulder Mix. If additional material is required, the Owner will supply the loam to be used by the Contractor to manufacture the additional Shoulder Mix. Contractor shall be responsible for manufacture, delivery, and placement of Shoulder Mix material.
- G. Plow strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal to receive fill.
- H. Grade areas to a smooth surface to cross sections, lines, and elevations indicated. Grade lawns, walkways, and unpaved subgrades to tolerances of plus or minus 1 inch and pavements and areas within building lines to plus or minus 1/2 inch.
- I. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

3.3 BACKFILL & COMPACTON

- A. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface, pulverize, moisture-condition or aerate soil, and recompact. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread to dry. Assist drying by discing, harrowing or other methods to reduce moisture level to that required.
- B. Deposit backfill material evenly on all sides of structures to avoid unequal soil pressures.
- C. Do not allow large masses of backfill material to be dropped into the excavation in such a manner that may endanger pipes and structures.
- D. Provide and place backfill and fill in layers not more than 8 inches in loose depth at optimum moisture content. Compact each layer under structures, building slabs, pavements, and walkways to the specified percent of maximum dry unit weight.
- E. Compaction: Compact top 12” of subgrade and each successive layer of fill to 95% of maximum dry density. Field density tests shall be provided in accordance with ASTM 1556 or ASTM D2922 methods. They shall be provided, as a minimum, at the following locations, frequency and meeting the following requirements:
 - a. One test per each 8” lift for every 2000 sf, or one test per 200 linear feet, or one test per lift, whichever is greater.
- F. Allow testing agency to inspect and test each subgrade and each fill or backfill layer and verify compliance with requirements. Cost of compaction testing shall be paid for by allowance.
- G. Under pavements and walkways, place subbase course material on prepared subgrades and compact at optimum moisture content to required grades, lines, cross sections, and thicknesses.
- H. Improper Backfill: When excavation and trenches have been improperly backfilled, and/or when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition. Excavation, backfilling, compacting work and testing performed to correct the improper backfilling shall be performed at no additional cost to the Owner.

3.4 RIP-RAP

- A. Slopes to be protected by rip-rap shall be free of brush, trees, stumps, and other objectionable material and be dressed to a smooth surface. All soft or spongy material shall be removed to the depth shown on the plans or as specified by the Engineer and replaced with approved material. Filled areas will be compacted thoroughly. A toe trench as shown on the plans shall be dug and maintained until the rip-rap is placed.
- B. Place a sand pad at least 4 inches thick. Place fabric over prepared area overlapping all seams 3 feet. Apply a 4 inch layer of gravel over the filter to cushion the stone. Stone placement shall begin at the toe and proceed upslope. The stone shall be dropped from not more than 24 inches. Placement shall conform to MDOT Standard Specifications Section 610.032(b) for plain rip-rap except as modified herein.

- C. It is the intent of these specifications to produce a fairly compact rip-rap protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified.

3.5 ROCK & LEDGE EXCAVATION

- A. Comply with NFPA 495 and applicable State and local codes.
- B. Rock & ledge excavation work includes the removal of ledge and rock required for the installation of pipes, structures roads or other items required by the contract. Rock & Ledge excavation is anticipated in this contract and shall be paid for by Unit Price, as described in the contract documents. Pre-blast survey, blasting schedule and blasting plan shall be considered incidental to the ledge removal unit price.
- C. "Ledge" and "rock" include any natural compound, natural mixture, and chemical element required to be excavated that, in the opinion of the Engineer, can be removed from its existing position and state only by blasting, drilling and blasting, wedging, drilling and wedging, wedging and breaking with power hand tools, or by extending the use of an approved excavating machine beyond normal and design wear and tear. No boulder, ledge, slab, or other single piece of excavated material less than three cubic yards in total volume shall be considered to be rock unless, in the opinion of the Engineer, it must be removed from its existing position by one of the methods mentioned above.
- D. Excess stone, granite blocks, taken from trenches or blasted shall be removed from site and disposed of by the Contractor.
- E. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site. Blasting shall comply with the requirements set forth in the specifications and be within the guidelines of "Blasting Guidance Manual," Office of Mining, Reclamation, and Enforcement, U.S. Department of Interior. (whichever is stricter shall govern). If blasting occurs on site it must meet the relevant requirements of 38 MRSA §490-Z, §484 and Maine Department of Environmental Protection (MDEP) rules Chapter 375.
- F. All trench excavation shall be classed as earth or rock/ledge.
- G. Approved trench width for utilities in ledge shall be 3 foot maximum.
- H. A qualified, licensed blaster shall be used for all blasting. A pre-blast survey shall be performed for all blasting unless such survey is specifically specified by the Engineer, in writing, not to be necessary. Structures within a 500-foot radius shall be surveyed. The pre-blast survey shall include both interior and exterior review and shall be documented with a video camera and still photographs as applicable. A separate form for each structure shall be created and kept on file for review by the Owner. These forms shall be turned over to the Owner at the project completion.
- I. Blasting Schedule: A blasting schedule shall be prepared by the blaster and published in a newspaper of general circulation, in the locality of the site, at least 10 but no more than 30 days prior to the commencement of the blasting. This schedule should be distributed to local

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governments, public utilities and residents with ½ mile of the proposed blasting. The schedule shall include information as outlined in 30 CFR 816.64. The schedule shall include the following:

1. Name, address and telephone number of operator
 2. Identification of the specific areas in which blasting will take place
 3. Dates and times of blasts
 4. Methods used to control access to the area in which blasting is anticipated
 5. Entity to contact if a pre-blast survey or well test is being requested by the Owner of the structure
- J. Blasting Plan: At least 2 weeks prior to any blasting taking place on site a blasting plan and pre-blast survey, prepared by the blasting Contractor, shall be submitted to the Owner. The blasting plan must be prepared and signed by a certified blaster per 30 CFR 780.13(a). The plan shall include MDEP standards for ground vibration, air overpressure, flyrock control, record keeping, and other relevant requirements as specified in 38 MRSA §490-Z(14)(L), as required by 38 MRSA §484, sub-§9. The plans shall include at least include and be governed by the following:
1. Sketches of the location of each blast, drill patterns, delay periods and decking.
 2. The plan shall identify and describe the protection measures for any non-owned structures within 500 feet of proposed blasting locations.
 3. The type and amount of explosives to be used, including weight of explosives per delay, stemming, critical dimensions and location and general description of structures to be protected.
 4. Frequency and peak particle velocity of blasts shall be monitored
 5. Peak particle velocity shall not exceed 1.25 in/sec.
 6. Ground vibration at offsite structures, due to blasting, may not exceed the limits shown in Figure B-1 of Appendix B, U.S. Bureau of Mines Report of Investigations 8507.
 7. Air overpressure offsite may not exceed the limits provided at MDEP Rules Chapter 375.10(C)(4)(c) and 38 MRSA §490-Z(14)(H)
 8. Flyrock must be controlled so as to remain on the site and may not enter a protected resource or adjacent property.
- K. Information on each blast shall be consistent with 38 MRSA §490-Z(14)(L). Blasting shall be monitored with a seismograph set up at the structure that is closest to the blasting area and should measure the air blast, peak particle velocity and frequency of each shot. The seismograph should have a Seismic Frequency range of 2 to 150 Hz and a sound frequency of 2-500 Hz. It must be capable of recording longitudinal, transverse and vertical peak particle motion. Records of each blasts consistent with 38 MRSA §490-Z(14)(L) shall be kept and submitted to the Owner at the completion of blasting or upon request. The monitoring will include the aforementioned requirements as well as the following and will be printed out for each blast and a copy given to the Engineer:

Instrument type
Instrument calibration date
Date and time of blast
Instrument location
Distance to blast
Resultant peak particle velocity (in/sec)
Seismograph operator
Airblast (dB)

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3.6 TRENCH CROSSINGS

- A. Backfill trenches to subgrade as noted herein. Match existing thicknesses of road base and subbase.

3.7 EXCAVATION PROTECTION

- A. Provide shoring, sheeting, bracing and protection at all excavations as required to prevent cave-ins of excavation and to assure complete safety of existing structures, utilities and pavements that are to remain in place.
- B. Comply with all local, State and/or Federal safety regulations as well as good construction practice.
- C. Completely fill with suitable material and thoroughly compact all voids left by the removal of sheeting. Where sheeting is to be left in place, obtain written permission from the Engineer to do so.

3.8 DEWATERING

- A. Furnish, operate and maintain dewatering equipment for control, collection and disposal of ground and surface water as required.
- B. The dewatering system shall consist of pumps, drains, well points, piping and any other facilities necessary to keep the excavations and trenches free from water. Dewatering shall be considered incidental to the contract unless specifically designated otherwise in the Contract Documents.
- C. Water pumped or drained from the site shall be disposed of in a suitable manner so as to avoid public nuisance, injury to the public health, damage to public or private property and/or damage to work completed or in progress.
- D. Design, construct and remove cofferdams where necessary for dewatering, control and diversion of water to keep excavations and trenches free of water. Cofferdams shall be designed to withstand all imposed loads to prevent injury to persons or property. Cofferdams shall be removed after the completion of permanent construction unless specifically directed otherwise in writing by the Engineer.
- E. Damage resulting from dewatering operations, or the failure of the Contractor to maintain the work in a suitable dry condition shall be repaired, to the satisfaction of the Engineer, at no additional cost to the Owner.

END OF SECTION 31 20 00

SECTION 31 25 00 - TEMPORARY EROSION and POLLUTION CONTROL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Provide all labor, equipment, materials and maintain temporary erosion control devices as specified herein and as shown on the Drawings.
- B. Standards:
 - 1. Maine Department of Environmental Protection (MDEP), “Maine Erosion and Sediment Control BMPs”, March 2003 or as later revised.
 - 2. Maine Department of Transportation Standard Specifications (MDOTSS), latest revision.
 - 3. MDEP Chapter 500 Stormwater Management; Appendixes A, B & C
- C. Submittals: Contractor shall furnish to the Engineer, in writing, his Erosion and Sediment Control Plan including proposed locations for storage of topsoil and excavated material before beginning construction. The plan shall also include an erosion control sequence and description of measures to be used to mitigate temporary erosion and shall meet the requirements of the MDEP standard noted above. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of the responsibility of completion of the work as specified.
- D. Provide such erosion control measures as may be necessary to correct conditions that develop prior to the completion of permanent erosion control devices or as required to control erosion that occurs during normal construction operations.
- E. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
- F. After awarded the Contract, prior to commencement of construction activities, meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control
- G. The plans and specifications provide direction and methods which should and will be used, however these may not be all-inclusive and other methods and Best Management Practices (BMP’s) may be required. The Contractor shall, at least weekly, review the site and the protection measures being used and determine if they are adequate to meet the requirement of minimizing erosion and preventing off-site sedimentation.
- H. Erosion control devices include, but are not limited to, silt fences, filter barriers, rock check dams, hay bales, sand bags, landscaping, and similar items. The extent of erosion control is only partially shown on the Drawings. The Contractor shall also furnish and

install all erosion control measures, which are required by other related authorities, such as DEP, local boards, and all other similar entities.

- I. The Contractor shall follow the conditions of any State permitting with regard to sedimentation and erosion control. A log of erosion control device inspections and measures taken to improve such shall be maintained by the Contractor for the duration of the project. This maintenance log shall be produced by the Contractor upon request by the Owner or MDEP.
- J. Design Criteria
 - 1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.
 - 2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stone: Stone for use in stone check dams shall consist be a clean material with no fines and be of hard, durable rock and shall conform to the following table:

<u>Sieve Designation</u>	<u>% by Weight Passing Square Mesh Sieves</u>
6"	90-100
1 ½"	0-40
No. 4	0-5

- B. Temporary Erosion Control Blankets: Photodegradable, polypropylene top & bottom net with 100% straw fiber matrix. Basis of Design: North American Green S150 or equal
- C. Water: Contractor shall provide water and equipment to control dust, as required by job conditions.
- D. Inlet protection devices: “Dandy Bags”, as manufactured by Dandy Products; Grove City, Ohio 43123, www.dandyproducts.com.
- E. Dewatering Bags: Dandy Dewatering Bags, as manufactured by Dandy Products; Grove City, Ohio 43123, www.dandyproducts.com.

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1. The inlet protection unit shall be a sewn in the U.S.A. geotextile fabric unit fitted to the individual grate(s) and completely enclosing the grate(s).
2. The Bag shall have lifting devises to allow manual inspection of the storm water system.
3. The Bag unit shall utilize an orange monofilament fabric manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	MARV
Grab Tensile Strength	ASTM D 4632	kN (lbs)	1.62 (365) x 0.89 (200)
Grab Tensile Elongation	ASTM D 4632	%	24 x 10
Puncture Strength	ASTM D 4833	kN (lbs)	0.44 (100)
Mullen Burst Strength	ASTM D 3786	kPa (psi)	3097 (450)
Trapezoid Tear Strength	ASTM D 4533	kN (lbs)	0.51 (115) x 0.33 (75)
% Open Area	COE -22125-86	%	10
Apparent Opening Size	ASTM D 4751	mm (US Std Sieve)	0.425 (40)
Permittivity	ASTM D 4491	Sec 1	2.14
Permeability	ASTM 4491	cm/sec	0.142
Water Flow Rate (gal/min/ft ²) 5607 (145)	ASTM 4491	l/min/m ² (gal/min/ft ²)	5607 (145)
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange

F. Mulch

1. Straw mulch shall consist of long fibered straw derived from oats, wheat, rye or other cultivated grains, reasonable free from weeds and other undesirable material. No material shall be used which is so wet, decayed or compacted as to inhibit even and uniform spreading. No chopped hay, grass clippings, or other short fibered material shall be used unless directed.
2. Cellulose fiber mulch shall consist of elongated wood fibers from virgin or recycled sources and post consumer newsprint. The woods fibers shall be tested to show no lead, asbestos or other heavy metals exceeding EPA toxic levels. Cellulose fiber mulch shall be free of refuse, physical contaminants, and material toxic to plant growth. Cellulose fiber shall not contain more then 30% post-consumer newsprint.

- G. Mulch Binder: Shall consist of a commercially developed product for the tacking of hay or straw. Binder shall be free of refuse, physical contaminants, material toxic to plant growth, or asphalt. Paper fiber mulch may be used as a binder at the rate of 3 kg /m² [0.6 lb/ ft²]. Paper fiber mulch shall consist of 100% post consumer newsprint processed to be applied hydraulically.

- H. Silt Fence shall meet the requirements of AASHTO M-288.
- I. Perimeter Sediment Control Socks and Wattles/Logs (silt fence alternative):
 - 1. Coir Fiber Logs: Coir fiber logs shall be new, 12” diameter, 9 pound per cubic foot density, with a poly netting and come in 10’ sections.
 - 2. Filter Socks: The filter sock shall be produced from 5 mil thick continuous HDPE filament, woven into a tubular mesh netting material with openings in the knitted mesh of 3/8”. This shall then be filled with compost meeting the specifications outlined in the 2003 AASHTO Provisional Standards, manual MP 9-03. Filter sock netting material shall be biodegradable. Unless otherwise noted socks shall be 8” in diameter. Install per manufacturers recommendations. Basis of Design: Filtrexx Silt Soxx.
- J. Mulch Berms: Berms shall be constructed from stump grindings which have sufficient earth mixed with the woody material to provide adequate flow retardance to water. Wood chips without earth mixed in are insufficient to provide adequate sedimentation barriers.

PART 3 - EXECUTION

3.1 NARRATIVE

- A. Erosion will be controlled with two main methods. The first shall be to reduce initial erosion by protecting bare soils. Regular mulching shall be applied throughout construction to minimize initial disturbance and soil particle suspension in water run-off. The secondary method shall be to control and catch sediment which may become suspended in the run-off. This shall be done using stone check dams, silt fence and sedimentation collection areas. Areas cleared of woody vegetation and roots will have this vegetation ground, mulched, and then used to create berms through which storm water can percolate.

3.2 INSTALLATION

- A. Temporary Erosion Checks: Construct temporary erosion checks in ditches and other locations as indicated on the drawings or directed by the Engineer.
- B. Perimeter sediment control materials (silt socks, coir wattles, silt fence) shall be installed per manufacturers’ instructions. Socks or wattles shall be staked to the ground as required but in no case at intervals less than 10’ on center and with 12” stake depth into the soil.
- C. Any disturbed areas to be left in rough graded form for more than 30 days but less than one growing season shall be limed, fertilized, temporary seeded and mulched.

- D. All disturbed areas shall be stabilized with lime, fertilizer, seed and mulch at the completion of the project. Permanent seeding shall meet the requirements of the seeding portion of the specifications and be based on the anticipated use. Permanent seeding shall be installed immediately upon reaching final grade.
- E. After seeding, areas disturbed shall be mulched as described in MDOTSS section 619. Hay shall not be used. Straw shall be used.
- F. Temporary construction entrances shall be constructed at all locations used for access to or from the site. The entrance shall be built of 1½” crushed stone, the full width of the access and at least 50’ in length or as detailed on the drawings.
- G. Weekly, or after precipitation producing the equivalent of one-half inch of rainfall or snowmelt, all mulched areas shall be inspected for suitability for erosion control and slope protection. Weakened areas shall be re-mulched as noted above.
- H. Every week and after precipitation producing the equivalent of one half inch of rainfall, the contractor shall inspect and maintain all erosion control measures. Maintenance shall include, but not be limited to removal of sediment from silt fence or berms if soil accumulates to a depth of one-half the fabric height: repair of stone check dams if runoff channelizes under or around the stone: removal of excess accumulated sediment from dewatering and inlet protection devices: and washing of temporary construction entrances.
- I. Erosion control mat shall be installed on all slopes in excess of 3:1 (H:V).
- J. When permanent soil stabilization has been achieved, such temporary materials and devices that are unsightly in appearance or not readily degradable shall be removed..
- K. Reuse: Materials and devices of suitable type and condition may be reused at other on-site locations when approved by the Engineer. Materials and devices, determined by the Engineer to be unsuitable for reuse, shall become the Contractor's property and shall be disposed of in a manner and location approved by the Engineer.
- L. Dewatering bags shall be removed from the site and disposed of in manner meeting State, local and Federal requirements.

3.3 MULCHING

- A. Straw mulch for both seeded and unseeded areas shall be spread evenly and uniformly over the designated areas. Unless otherwise directed, mulch shall be applied at the rate of 1.5 ton to 2 ton/acre. Too heavy an application of mulch shall be avoided. Lumps and thick mulch material shall be thinned.
- B. Unless otherwise authorized, hay or straw mulch shall be anchored in place by uniformly applying an acceptable mulch binder. Mulch binder shall be applied as soon as the mulch is placed. Application of a concentrated stream of mulch binder will not be

allowed. Mulch binder will be paper fiber mulch applied at 5 lbs/Unit or approved equal. Water spray may be used as a temporary binder.

- C. Temporary mulching shall be applied as required to maintain proper erosion control and seed cover, spread immediately to protect soil from erosion during all stages of construction throughout all seasons of the year.
- D. Cellulose Fiber Mulch shall be applied as a waterborne slurry. The cellulose fiber and water shall be thoroughly mixed and sprayed on the area to be covered so as to form a uniform mat of mulch at the rate of not less than 40 lb of mulch material per 1000 ft² unit of area.
- E. Cellulose fiber mulch may be mixed with the proper quantities of seed, fertilizer, and agricultural limestone as required may be applied separately the same day as seeding.
- F. The Contractor shall maintain the hay, straw, or fiber mulch by repairing all damaged mulch and by correcting all shifting of the mulch due to wind, water, or other causes, until an acceptable growth of grass has been achieved.
- G. If cellulose fiber mulch is used, any reseeding will require additional cellulose fiber mulch.

3.4 EQUIPMENT & FUELING

- A. Minimum equipment/vehicle fueling and maintenance practices that will be implemented to control pollutants to stormwater (e.g., secondary containment, drip pans, spill kits, etc.)
- B. Equipment Fueling - Equipment is to be fueled in designated areas on site. Fueling equipment is to be maintained according to OSHA regulations. Spill cleanup materials are to be provided by the operators of the equipment or the owners of the fueling equipment. Cleanup materials are to be present near the fueling area and clearly labeled.
- C. Equipment Repair and Maintenance - Unless vehicle cannot be moved without incurring further damage, no repairs are to occur on site. If a machine is creating a pollution problem, it must be removed from the site. No equipment will be permitted on site that is leaking any fuels, fluids or lubricants. Any and all routine maintenance is to occur offsite.
- D. Maintenance and Inspections shall occur daily

3.5 SPILL PREVENTION AND CONTROL

- A. All chemical agents are to be stored in OSHA and DOT approved containers, if applicable. All chemicals are to be stored in a safe manner, and stored in a secondary

containment unit whenever possible (i.e. fuel cabinet, concrete spill containment tank, etc.) Cleanup materials are to be present near the chemical storage area and clearly labeled. Spill cleanup materials are to be provided by the owner of the material.

- B. In the event of a spill, superintendent is to be notified of spill immediately. Spill is to be contained as quickly as possible, with provided cleanup materials. Spilled materials must be prevented from entering stormwater system. In the event of a spill for which there are inadequate cleanup materials, spill is to be contained with earth dikes until other measures can be implemented. Spilled chemicals and cleanup materials are to be isolated and disposed of according to Superintendent's instructions. Superintendent is to post and maintain a contact list of disposal resources in job trailer. Included in this list shall be emergency contact numbers for the manufacturers of any material brought on site by any subcontractor.
- C. Contractor will be responsible for response training for all employees on the site, as well as the foreman of each subcontractor on site. Foreman of subcontracting companies will be responsible for training each of their own workers in spill response. Subcontractors are to provide Superintendent with written confirmation that this training has been performed.

END OF SECTION 31 25 00

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SECTION 321216 - HOT-MIX ASPHALT PAVING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and hot-mix asphalt design mixes.
- B. Provisions of the General Conditions, Division 1 apply to this section.
- C. Provide hot-mix asphalt paving according to standard specifications of Maine Department of Transportation (MDOT), Division 400. Where the “Department” is referenced, it shall be construed to read the “Owner”.
- D. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by MDOT.
 - 1. Binder Course: HMA 19 mm Superpave
 - 2. Surface Surface Course: HMA 9.5 mm Superpave
 - 3. Sidewalks: HMA 9.5 mm Superpave
- B. Tack Coat: AASHTO M 208, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- C. RAP for Asphalt Pavement: Recycled Asphalt pavement may be used in hot-mix asphalt as allowed in section 703.08 of MDOTSS.

PART 3 - EXECUTION

3.1 PAVING

- A. Batch plants, paving equipment and paving procedures shall conform to MDOT Specification sections 401.02 through 401.18 and Section 403.01 thru 403.03. Quality Control Method “D” acceptance limits from section 401.204 shall be used unless otherwise noted. If the mix is outside the acceptance limits the Owner may require the removal of all the mix and require re-paving at the Contractors expense.
- B. Tack coat existing asphalt or concrete surfaces and allow tack coat to cure undisturbed. Tack shall be required prior to placement of any bituminous material upon a lower course unless prior

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course has been placed within 2 days and is, in the Engineer's opinion sufficiently clean. Bituminous tack coat shall meet MDOT specification requirements of section 409. The applied rate shall be 0.025 gal/yd².

- C. Place hot-mix asphalt to required grade, cross section, and thickness. Promptly correct surface irregularities in paving course.
 - 1. Spread mix at minimum temperature of 275 deg F.
- D. Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers. Complete compaction before mix temperature cools to 185 deg F.
- E. Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness.
- F. Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to 92 percent of reference maximum theoretical density according to ASTM D 2041.
- G. Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- H. Remove and restore paved areas that are defective or contaminated.
- I. Trench paving: Pavement in trenches shall be of the same thickness as adjacent pavement but no less than 3" in any case.

3.2 PAVEMENT MARKING

- A. Apply pavement-marking paint with mechanical equipment as specified in MDOT specification section 627.
- B. All pavement markings shall be dimensioned and sized to meet the requirements of the Manual on Uniform Traffic Control Devices as approved by the Federal Highway Administration.

END OF SECTION 32 12 16

SECTION 32 16 00 - CURBING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. All new curbing shown on plans.

B. Related Sections:

1. Division 32 12 16 Section "Hot Mix Asphalt Paving".

1.2 PERFORMANCE REQUIREMENTS

- A. Curbing shall be stable and self supporting. It shall be neat a clean in appearance and follow the grades of the adjacent surfaces.
- B. Curbing shall meet the requirements of Maine Department of Transportation Standard Specifications (MDOTSS) section 609.
- C. Color shall match existing curbing if new is to be placed abutting old.

1.3 SUBMITTALS

- A. Product Data: For each type of curbing indicated on the drawings or described herein.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Material shall be carefully stored and protected from damage.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Bituminous Curbing: Curb shall meet the requirements of MDOTSS section 609.02 and 609.04 and the relevant, referenced sections of Division 700 – Materials. Curbing shall match existing, adjacent curbs unless otherwise specified by the Owner.

PART 3 - EXECUTION

3.1 Installation

- A. Bituminous Curb: Where this curb is used to match back into existing curb, disturbed over the course of construction or where new bituminous curbing is required, it shall match the profile shown on the drawings the shall be placed according to MDOTSS section 609.04. If no profile is shown on drawings then profiles shall match typical MDOT profiles for sidewalk or non-sidewalk areas, as is relevant to the curb location.

- 3.2 Removal of Curbing: The Contractor shall carefully remove and store curb specified on the plans or designated for resetting. Curb damaged or destroyed, because of the Contractor's operations or because of their failure to store and protect it in a manner that would prevent its loss or damage, shall be replaced with curbing of equal quality at the Contractor's expense.

- 3.3 Cutting and Fitting: Cutting or fitting necessary to install the curbing at the locations directed shall be done by the Contractor.

END OF SECTION 32 16 00

MOUNT DESERT FIRE DEPARTMENT – STATION #1

SECTION 32 92 00 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Certification of grass seed, product certificates and planting schedule.
- B. Planting Restrictions: Plant during one of the following periods.
 - 1. Spring Planting: April 15 to July 15
 - 2. Fall Planting: September 1 to October 15
- C. Maintain lawn/seeding until established, but for not less than 30 days.

PART 2 - PRODUCTS

2.1 GRASSES

- A. Seed Species: State-certified seed of grass species, as follows:

- 1. Seed Species: Seed of grass species as follows:
 - Percent Germination > 80%
 - Pure Live Seed > 85%
 - Percent Purity > 85%
 - Weed seed < 1%

The seed mixture shall consist of the following proportions by weight:

Creeping Red Fescue	45%
Kentucky Bluegrass	25%
Chewings Fescue	15%
Perennial Ryegrass	10%
Annual Ryegrass	5%

2.2 SOILS AND AMENDMENTS

- A. Topsoil: Soils meeting the requirements of MDOT section 615.
- B. Lime: ASTM C 602, Class T, agricultural limestone.
- C. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

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- E. Commercial Fertilizer: Commercial-grade complete fertilizer, consisting of 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
- F. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium; 20 percent nitrogen; 10 percent phosphorous; and 10 percent potassium; by weight.
- G. Straw Mulch: Clean, mildew- and seed-free salt hay or threshed straw of wheat, rye, oats, or barley.
- H. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5. Meeting requirements of MDOT section 619.

PART 3 - EXECUTION

3.1 PREPARATION

- A. See MDOT specification sections 615, 616, 618 & 619 for approved procedures and methods.
- B. Loosen subgrade to a minimum depth of 4 inches, remove stones, sticks, existing grass, vegetation, and other extraneous materials.
 - 1. At newly graded subgrades, spread planting soil mix to a depth of 3 inches but not less than required to meet finish grades.
 - 2. At unchanged grades, apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
- C. Grade lawn areas to a smooth, even surface with loose, uniformly fine texture. Moisten before planting.

3.2 PLANTING

- A. Seeding Methods shall be as described in MDOTSS section 618.01 unless noted otherwise.
- B. Seeding: Evenly distribute seed by sowing with a spreader or a seeding machine. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray. Protect seeded areas by spreading straw mulch 1-1/2 inches in loose depth.
 - 1. Seeding Rate: 3 to 4 lb/1000 sq. ft. or appropriate MDOT specification.
- C. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Uniformly blended into a homogeneous slurry.
 - 1. Apply slurry uniformly at a rate so that mulch component is deposited at no less than 1700-lb/acre dry weight, and seed component is deposited at no less than the specified seed-sowing rate.
 - 2. Seeding Rate: 3 to 4 lb/1000 sq. ft.

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- D. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.
- E. Mow lawn as soon as top growth is tall enough to cut. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

END OF SECTION 329200

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SECTION 334000 - STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Items to be submitted include: Catch basin layouts, pipe, fittings, frames, structures, covers and other similar items. Prior to ordering catch basins, the Contractor shall obtain field level information to establish rim elevations for each catch basin. Catch basin component submittal schedule shall include at a minimum: proposed rim elevations, riser ring thickness, individual height and size of all pre-cast sections, positioning (horizontal and vertical) of all pipe penetrations into the manhole, invert elevations of all pipes into the catch basin.
- B. Provisions of the General Conditions, Division 1, for Allowances and Submittal Requirements apply to this section.

1.2 DESCRIPTION OF WORK

- A. This section applies to all piping and structures associated with the storm drainage and storm-water management system. Specific details and specifications are also shown on the drawings for treatment and conveyance systems.
- B. Soils associated with the storm-drainage systems are specified in the earthwork section and on the drawings.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- A. Corrugated-Steel Pipe (CMP): Aluminum coated corrugated steel pipe. This pipe and special fittings such as elbows, tees, and wyes shall conform to the requirements of MDOTSSNB, Subsection 707.10 (Type 2), Aluminum Coated (Type 2) Corrugated Steel Pipe. Unless otherwise noted, corrugations shall be ½”.

Unless designated otherwise on the drawings, minimum wall thickness shall be as follows:

<u>Size</u>	<u>Minimum Gage</u>
8” through 30”	14
36” through 54”	12
60”	10
72”	8

1. Fittings: Fabricated to types indicated and according to same standards as pipe.
 2. Connecting Bands: Standard couplings made for corrugated-steel pipe to form soiltight joints.
- B. Corrugated PE Pipe and Fittings: Pipe culverts and storm drains so designated shall conform to the requirements of MDOTSSNB, Subsection 603 and 706.06. Corrugated Polyethylene Pipe used for Option III will meet the requirements of AASHTO M294 type S, Dual Wall. Corrugated Polyethylene Pipe (and fittings) for Underdrain shall conform to AASHTO M252, slot perforated, for 6-inch diameter or less and to AASHTO M294 for 12-inch to 30-inch. Pipe to be used for Underdrain Type C shall be perforated in accordance with the applicable requirements of AASHTO M36/M36M Type III, Class I perforations. Pipe shall be corrugated with an integrally formed smooth waterway and be non-perforated or perforated as indicated on the drawings. Installation shall include all necessary boots, gaskets and adapters required to provide a “soil-tight” connection at all manholes, joints and fittings. Pipe shall be ADS N-12 ProLink Ultra pipe with integral bell-and-spigot joint meeting the requirements of ASTM F477 or approved equal.
- C. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D3034, SDR 35, for gasketed joints. Include ASTM F477 elastomeric-seal gaskets. Perforated pipe shall be ½” diameter holes, 5” on center, 2 rows and 120° apart.
- D. Special Pipe Couplings and Fittings: Rubber or elastomeric sleeve and band assembly fabricated to match OD of pipes to be joined, for non-pressure joints.

2.2 UTILITY STRUCTURES

- A. Precast Concrete Catch Basins: ASTM C913, precast, reinforced concrete; designed according to ASTM C890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading, with provision for with Bell-and-spigot or tongue-and-groove joints formed on machine rings to ensure accurate joint surfaces..
1. Joint Sealants: ASTM C990, bitumen or butyl rubber.
 2. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
 3. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section.
- B. Precast Concrete Field Basins: ASTM C913, precast, reinforced concrete; designed according to ASTM C890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading.
1. Grade Bricks: Include 2 courses of brick below the frame to bring frame to finish grade. Pre-cast concrete riser rings may also be used in place of brick courses.
 2. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section.

- C. Cast iron catch basin frames and covers shall be cast of material conforming to the requirements of ASTM A48 Grade 30 and be of uniform quality, free from blowholes, porosity, hard spots, shrinkage distortion or other defects. They shall be smooth and well-cleaned by shotblasting or other approved method. They shall be of heavy-duty construction weighing not less than 430 pounds and machined on both vertical and horizontal seating surfaces. Frames shall be 4-flange unless inlet curb inlet is specified, in which case they shall be 3-flange. Grates shall be non-rocking and be “Cascade” type unless located in lawn areas or otherwise noted. Lawn areas shall have 2” square opening covers. Acceptable manufacturers: Neenah Foundry Company or approved equal. Unless otherwise noted, beehive covers shall be R-2560-E2, square opening covers shall be R-3588-A, cascade frame shall be R-3589-LR/LL
- D. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise indicated.
- E. In-line or Drain basins: Drain basins shall be thermo-molded PVC stock. Joint tightness shall conform to ASTM D3212. The pipe bell spigot shall be joined to the main body of the drain basin. Grates for surface drainage inlets shall be ductile iron and made specifically for each basin to provide a round bottom flange that closely matches the diameter of the surface drainage inlet. Grates for drain basins shall be capable of supporting H-25 wheel loading for heavy-duty traffic or H-10 loading for pedestrian traffic. Basins and covers shall be as provided by Nyloplast, a division of Advanced Drainage Systems, Inc. or approved equal. Covers shall be as indicated on the drawings and be ductile iron and locking.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream.
- B. Culverts shall be installed with an impervious trench dam or anti-seep collar within 5’ of the invert in of
- C. Install piping pitched at minimum slope of 1 percent and 36-inch minimum cover, unless otherwise indicated.
- D. Use catch basin for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing line is indicated.
- E. Cascade grates shall be oriented such that the vanes face the direction of the inflowing water. If water approaches from two opposite directions the vanes shall be oriented 90° to the two flow paths.

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- F. Install hub-and-spigot, cast-iron soil pipe and fittings with rubber gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Volume I. Use gaskets that match class of pipe and fittings.
- G. Install PE pipe and fittings according to ASTM D 2321. Join pipe, tubing, and fittings with couplings for soiltight joints according to manufacturer's written instructions. Install corrugated piping according to the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
- H. Install PVC pipe and gasketed fittings with gaskets according to ASTM D 2321.
- I. All basins shall be cleaned of debris and sediment prior to final completion.

END OF SECTION 334000